

NOVEMBER 6, 1941

# *The* IRON AGE

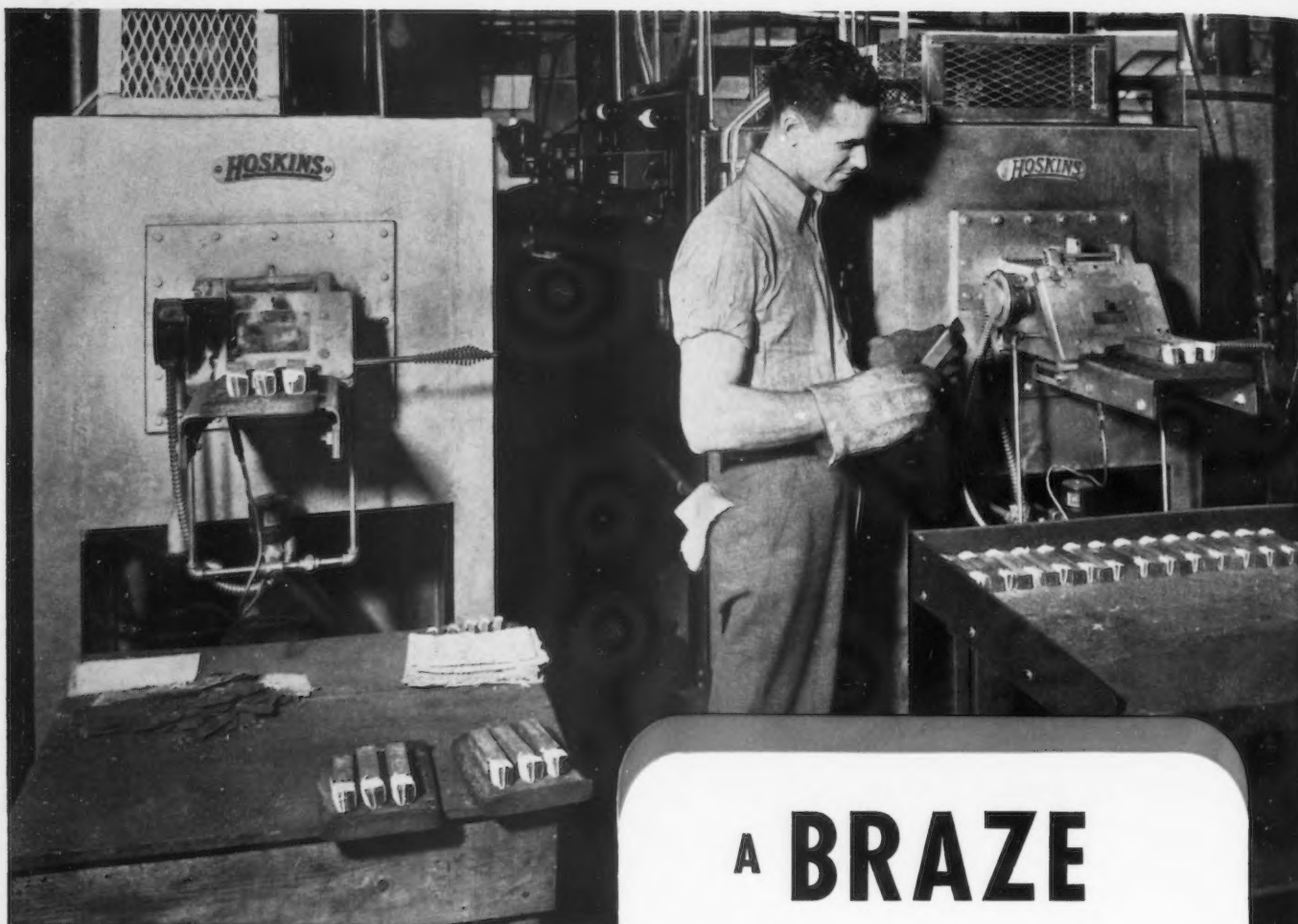
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NOVEMBER 6, 1941

VOL. 148, NO. 19



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# STEELS



# THE IRON AGE

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NOVEMBER 6, 1941

◦ ◦  
ESTABLISHED 1855



## "True Steel"

THERE is a book, just published, entitled "True Steel." It is the story of George M. Verity, the loved and respected chairman and founder of the American Rolling Mill Co., and it tells how he established and built that business.

It is a book that will be "must" reading for the many thousands of friends of George M., and it should be "must" reading also for all of the friends and followers of the American System of Enterprise. For this book is as much a biography of one as of the other.

It was the American System of Enterprise that made it possible for George M. Verity, and the associates he gathered around him, to do what they did. To start with no capital except brains and the willingness to work, with no tools except ideas and ideals, and from this combination build a steel business with total assets of more than \$150 million and rated among the top eight in American industry. And to do this in the most fiercely competitive age that this country or any other has known.

In these modern days, when Horatio Alger's books have gone out of fashion, and the idea seems to be to try to get the most for the least effort, when the exercise of initiative is being discouraged by precept and example, one may indeed wonder whether it will be possible in the future for industrial history to repeat itself. Whether it will be possible again for a boy with as little material advantages as this son of an itinerant preacher to build as this man and others like him have built.

The industrial edifice of America has not been constructed upon a foundation of bricks and mortar, nor has our unequalled standard of living been, as some believe, machine made.

For underlying every example of success in constructive enterprise and back of every improvement in process or machine has been the kind of leadership that can inspire men to enthusiastic cooperative endeavor. Leadership is the term for it. Leadership and not drivership. The sort of leadership that is willing to forget the hour of the day or the day of the week; to forego self interest in the cause of service and to forge steadily ahead toward the goal of more work for more men and more things for more people.

But the environment must be right or leadership won't work. And if it does not work, then there will be no more poor boys who can grow into captains of industry and no more little manufacturing plants that can grow into big ones.

I want to see this environment preserved for the sake of the America to come. And that is why I suggest that you read "True Steel." It will give you a picture of the real America that is worth fighting for, whether its enemies are within or without.

*John D. Warr*



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## Is Helping Put American Bombers *in the Air*

Speeding production of steel for the construction of bomber assembly and motor plants is typical of Inland's participation in America's Defense Program. Thousands of tons of Inland steel have gone into the Studebaker and Buick airplane motor plants at Chicago, and into many bomber plants throughout the country.

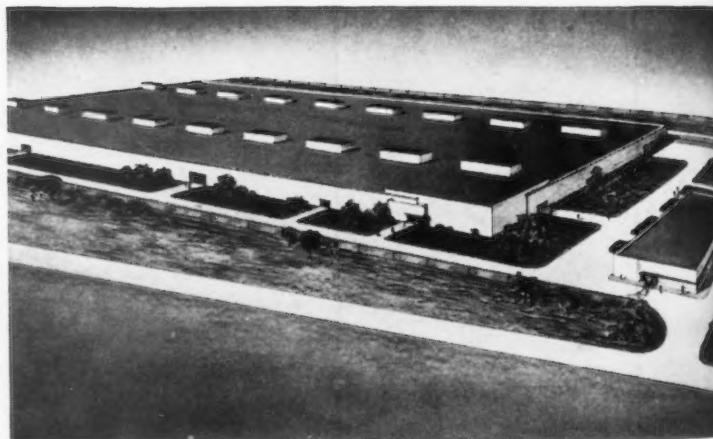
Among the products which Inland furnishes for these and for many other defense construction projects are structural shapes for columns and girders, bars for concrete reinforcement, rails for switch tracks, and sheet steel for ventilating equipment and roof decking.

The projects illustrated here are examples of the splendid manner in which so many of our leading corporations, normally engaged in "non-defense" work, are cooperating in the Defense Program.

As for Inland, every phase of our business is geared to this one great purpose. Our mills are setting new production records; our schedules are being constantly made and re-made so that steel for our Country's Defense will be delivered when and where needed. Yes, National Defense is Inland's No. 1 Job!



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*Design, Construction and Operation of*

# Open Hearth With Basic Roof

By LEWIS B. LINDEMUTH

*Consulting Engineer, New York*

THE development of the basic roof for basic open hearth furnaces has extended over at least the last seven years, five of which have seen its successful application in Europe and, since 1937, in England and an experimental installation in Australia.

The writer's first contact with this construction was early in 1936 at the Roechling Works in Saarbrücken and the Bochum Works in Bochum. At that time all of the furnaces at both plants were built with chrome-magnesite roofs.

These were 60 to 100-ton furnaces and both claimed an average of more than 1200 heats from their roofs, a surprising increase in production and 1 Reichsmark (40c.) decrease in repair costs. At Saarbrücken the writer saw the 1399th heat tapped from one furnace with the roof still in good condition.

All of these furnaces, and all of those since built, have been made from chrome-magnesite bricks

manufactured by the Austro-American Magnesite Co. at Radenthein in southeastern Austria. They all have been 12-in. roofs with 15-in. or 16-in. ribs, and insulated.

It might be well to state here that in speaking of furnaces with basic roofs, this means not only the complete roof but the entire structure from the slag pocket arch at one end to the slag pocket arch at the other end. The slag pocket arch itself is silica. In an article in *THE IRON AGE*, Mr. Chesters of the United Steel Companies, England, refers to these furnaces as "all basic" furnaces. We will probably need some other method of specifying such furnaces in order to avoid confusion between basic construction and the basic process.

The extent of the application of basic bricks is shown in Figs. 1, 2 and 3. The advantages to be gained are:

- (1) Greatly prolonged furnace life.
- (2) Higher furnace temperature and, therefore, a higher production rate, and
- (3) Better refining control.
- (4) Lowered refractory cost.
- (5) Lower "cost above" from items other than rebuilding and repairs.

(6) Lower limestone charge for the same kind of finishing slag and therefore less slag volume.

(7) A more uniform production rate from the open hearth department.

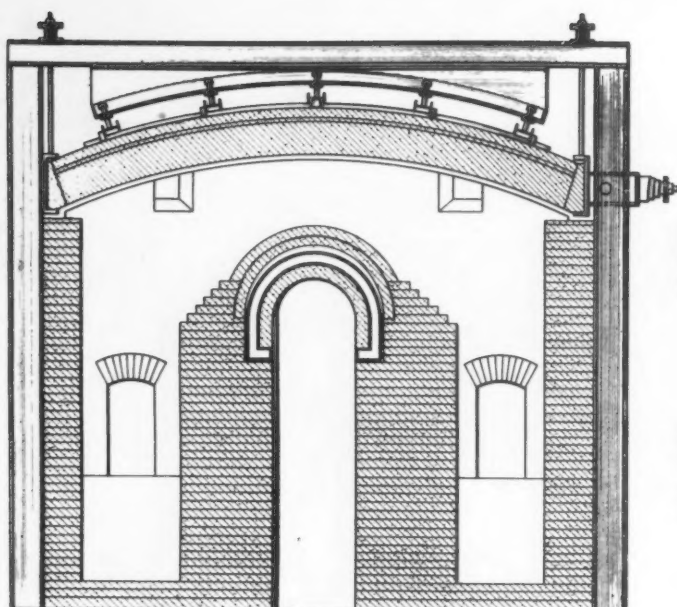
The disadvantage is higher first cost, which is very quickly wiped out.

After seeing the results at these two German plants and their method of construction, the writer made several trips to the magnesite plant in Austria. In conjunction with their engineers, two furnaces were redesigned to accommodate them to basic construction. One was for the Broken Hill Proprietary Co. in Australia, and the other for Richard Thomas & Co. in England.

## The Richard Thomas Furnace

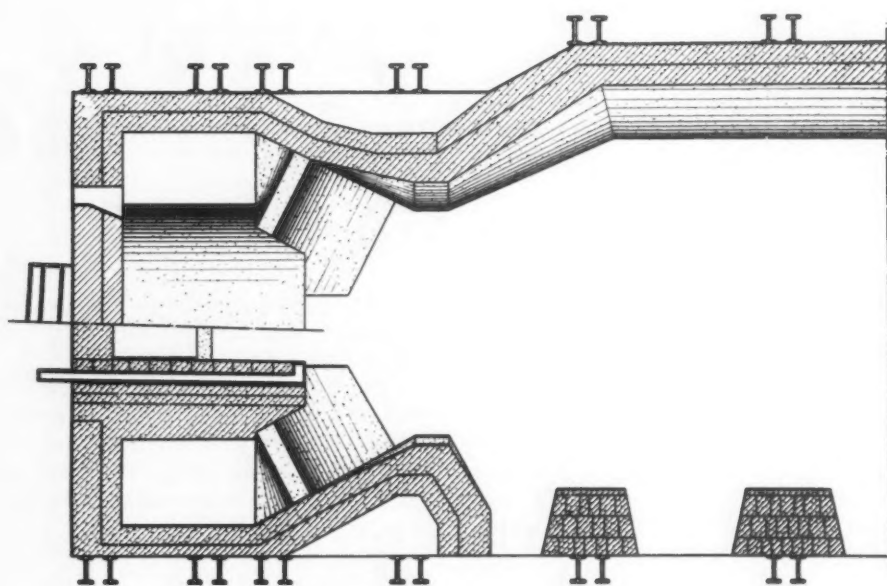
The one in England was built first, in November, 1936. It was producer gas fired, had a hearth 42 ft. long and a roof span of 19 ft. It tapped heats of only about 100 tons, although it was large enough for 150 tons. This furnace is shown in Fig. 4.

For the 43 weeks preceding the change, the furnace averaged 900 gross tons per week. For the first 27 weeks after being built basic,



**FIG. 1A —** Application of basic brick in the open hearth.

**FIG. 1B —** Another view showing basic brick construction.



its average was 1430 tons, an increase of 58.9 per cent.

It ran for 58 weeks, making approximately 700 heats from the roof as against an average for the other furnaces of 20 weeks, with approximately 200 heats from roofs. During the 58-week run of the basic furnace, it was necessary to repair or replace the checkers three times, and the final life of the furnace was determined by checkers. The roof could have lasted a short time longer.

In England it had been the custom, up until after the start of the war, to shut down all open hearth furnaces from 1:00 p.m. Saturday until 1:00 p.m. Sunday. That condition existed during the time that the figures quoted above were obtained.

At the end of the 58-week campaign, the basic roof was replaced, the uptakes repaired and checkers replaced, flues cleaned, etc., and a few minor alterations made.

The writer has the actual open hearth production reports for the first 10 weeks ended June 10, 1939, after the basic furnace started on its second campaign. There might be some understandable reluctance to quote these figures without this confirmation, but even so they will be qualified somewhat. All tons are 2240 lb. See Figs. 5 and 6. "B" furnace is the basic one as shown in Fig. 4. "F" furnace was one which the writer had designed for coke oven gas and tar. It had a deeper hearth, controlled air and fuel input, used a "run-off" or "flush" slag. A, B, C, D and E

furnaces had no control whatever, and no "run off" slag. The latter is particularly important at this plant as they use over 70 per cent hot metal containing 1.40 per cent phosphorus, and without it 30 per cent slag volume is necessary.

"F" was by far the best operated furnace in the plant, including "B". "F" furnace is shown in Fig. 7. The peculiar end construction is due to the slag pockets and checkers being entirely separated. This furnace has since been rebuilt with basic roof and ends, making the third for this plant. No reports have yet been received for it except in an unofficial letter saying that "it is making some amazing tonnages."

#### Broken Hill Proprietary Co.

In Australia, No. 1 furnace at Newcastle was built all basic except the main roof from knuckle to knuckle. The cost of importing these bricks into Australia was so high, approximately \$900 per 1000 equivalent 9 in., that the trial installation was made to determine the essential economies. However, even with this partial construction and the high price of the bricks, substantial economies were made, and a brick plant is now in construction for their manufacture in Australia from local raw materials.

This furnace is shown in Fig. 8. It has a hearth 34 ft. long and a roof span of 18 ft. 6 in., and taps 125-ton heats. (2240-lb. ton.) The pig and scrap charge is 80 per cent hot metal. This furnace started operation with its basic ends about May 1, 1938.

For the 14-month period ended June, 1939 it produced 93,238 gross tons compared to an average of the other operating furnaces for the same period of 71,313 tons; an increase of 30.7 per cent. In this average, four of the furnaces are larger, the rest the same size as No. 1. The basic furnace was producer gas fired, a number of the others use tar or coke oven gas and tar.

The basic roof and ends lasted for two of the silica sections of the roof without repair. At the end of this time 718 heats had been made, which is the end of the 14-month period where the tonnages just given had been produced. It was found necessary to repair the roof knuckles where the silica and chrome-magnesite bricks were in contact, and also the bulkheads. There were no basic bricks avail-

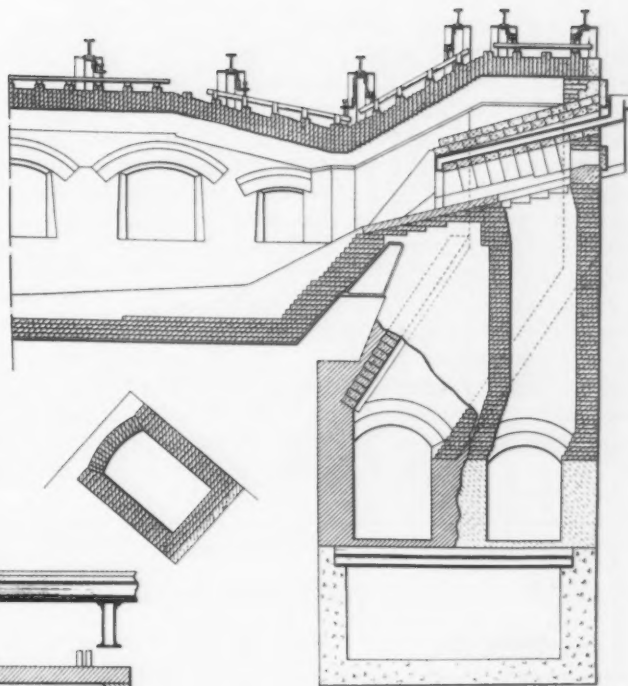


able for patching, so the port roof on one end was taken down to supply basic bricks for the other end. The repaired end ran for another silica roof, making the life of that end and end roof 1053 heats. At this time the entire remaining part of the basic roof was replaced with silica.

This furnace was sufficient to demonstrate the feasibility of the

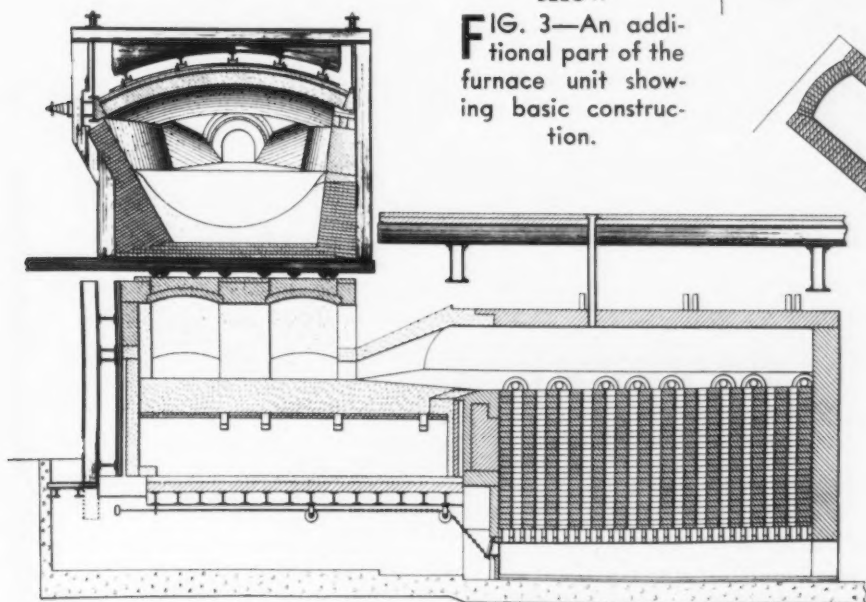
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**FIG. 2**—Basic brick used elsewhere in the furnace is shown here.

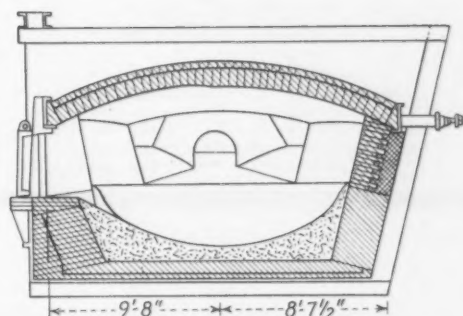
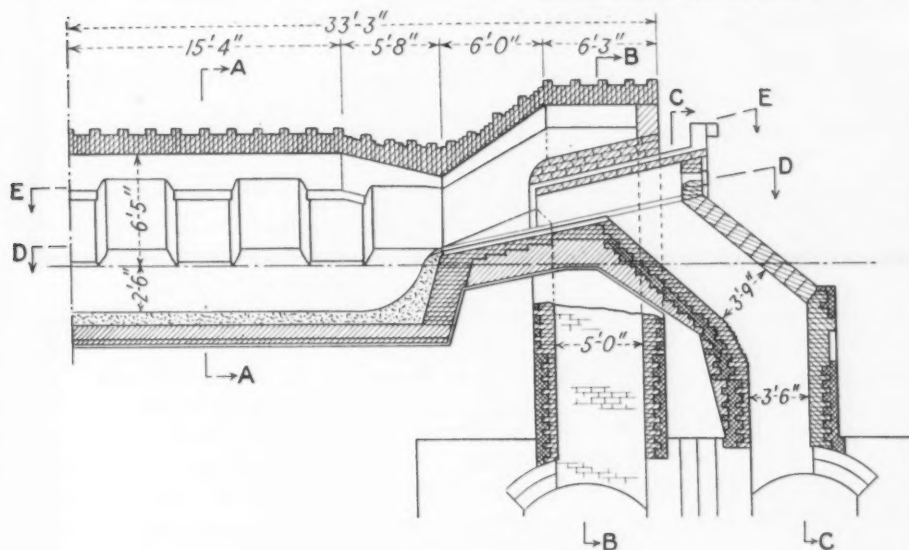


BELOW

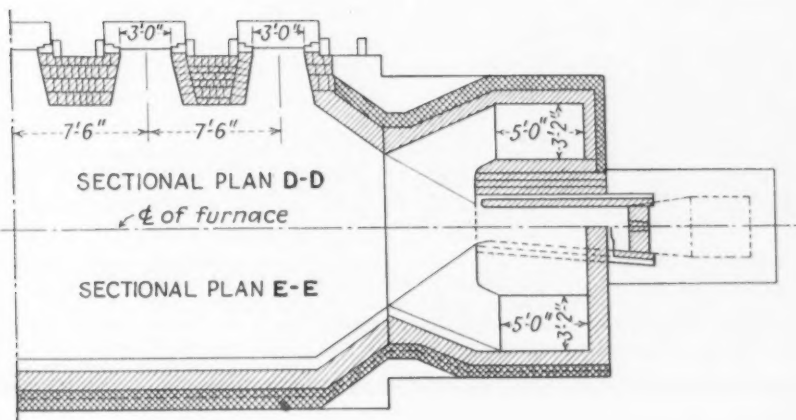
**FIG. 3**—An additional part of the furnace unit showing basic construction.



**FIG. 4**—This basic furnace was built in England in 1936



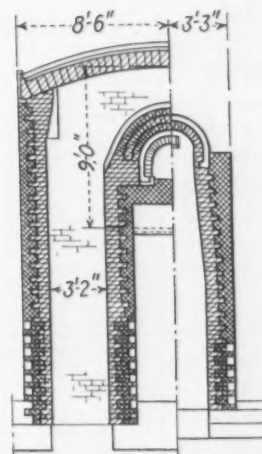
SECTION A-A



SECTIONAL PLAN D-D

of furnace

SECTIONAL PLAN E-E



HALF SECTION B-B

HALF SECTION C-C

basic roof and the advantages of the basic ends; but it could not demonstrate the limit of increased production possible because of the necessity of holding down the temperature for the silica section of the roof.

Unlike the plants in pre-war England, the Australian furnaces operate seven days per week as in this country; also, they are all well managed and operated, and checkers last for several years.

Other similar results from England and the Continent have recently been published by Messrs. Chesters of United Steel Companies

and Phillip Reinartz of the American Rolling Mill Co.

The Dorman Long Co. of Middlesbrough equipped a 200-ton tilting furnace in this manner. The writer's only report is that at 500 heats the roof was in good condition. They were using the Talbot process in this furnace.

### Construction

Two major considerations and several minor ones have made it possible to construct a basic arch of open hearth roof size, which permit it to stand up under the stresses of high temperature. The first is

that a better brick has been developed for this purpose. It is a chrome-magnesite brick containing 60 per cent or more of chrome ore and made from carefully selected raw materials, accurately screened to size, formed at high pressure and burned at high temperature.

The second major factor is the method of supporting the roof with provision for expansion and contraction. The minor considerations, which are nevertheless important, are accuracy in laying the bricks, the use of metal liners between the bricks and the use of key bricks instead of wedges.

<div> <div>11/10/2020</div> <div>J. N. KILBY, Esq. General Manager</div> </div>									
Melting Shc									
Pd	Weeks Worked	Exp-rt of Life	Output		Total				
			This Week	Last Week	This Week	Last Week	This Week	Last Week	
A	19	4	110.3	112.7	7.46				
B	38	0.4	114.16	1195	7.09				
C	1	19	772.1	606	7.00				
D	7	13	1126.1	11818	7.27				
E	17	5	1164.1	11314	7.96				
F	8	18	1153.0	1111	7.84				
Total on Average 1108.2 6011 7.84									
<div> <div>6-1-2021</div> <div>J. N. KILBY, Esq. General Manager</div> </div>									
Melting Shc									
Pd	Weeks Worked	Exp-rt of Life	Output		Total				
			This Week	Last Week	This Week	Last Week	This Week	Last Week	
A	24	245	765.10	1141.7	7.08				
B	1	44	276.7	-	7.55				
C	6	14	979.3	1014.2	6.23				
D	12	8	1105.14	1120.38	7.17				
E	22	0.4	1133.26	7.54					
F	7	13	1138.14	1139.1	8.84				
Total on Average 1108.2 6004.2 7.39									
<div> <div>13-1-2021</div> <div>J. N. KILBY, Esq. General Manager</div> </div>									
Melting Shc									
Pd	Weeks Worked	Exp-rt of Life	Output		Total				
			This Week	Last Week	This Week	Last Week	This Week	Last Week	
A	26	2	113.7	762.7	7.23				
B	3	42	1227.7	1458.6	9.73				
C	8	off	880.7	1006.12	5.73				
D	14	6	884.12	1005.14	6.30				
E	1	19	175.19	-	5.52				
F	9	11	1108.4	1445.1	8.18				
Total on Average 1108.2 6004.2 7.39									
<div> <div>27-1-2021</div> <div>J. N. KILBY, Esq. General Manager</div> </div>									
Melting Shc									
Pd	Weeks Worked	Exp-rt of Life	Output		Total				
			This Week	Last Week	This Week	Last Week	This Week	Last Week	
A	27	1	11.11	1113.7	7.33				
B	4	41	1591.15	1227.7	10.62				
C	8	off	880.7	1006.12	5.73				
D	15	5	816.1	884.12	7.12				
E	2	18	1166.15	175.19	7.52				
F	10	10	1268.12	1108.4	8.46				
Total on Average 1108.2 6004.2 7.39									
<div> <div>3-2-2021</div> <div>J. N. KILBY, Esq. General Manager</div> </div>									
Melting Shc									
Pd	Weeks Worked	Exp-rt of Life	Output		Total				
			This Week	Last Week	This Week	Last Week	This Week	Last Week	
A	28	Out	1029.12	1135.19	6.61				
B	5	40	1213.8	1591.15	11.59				
C	8	13	1295.1	-	6.00				
D	16	4	1218.16	816.1	7.05				
E	3	17	1265.17	160.15	7.56				
F	11	9	1218.1	1268.12	7.90				
Total on Average 1108.2 6004.2 7.39									
<div> <div>10-2-2021</div> <div>J. N. KILBY, Esq. General Manager</div> </div>									
Melting Shc									
Pd	Weeks Worked	Exp-rt of Life	Output		Total				
			This Week	Last Week	This Week	Last Week	This Week	Last Week	
A	30	1	110.3	112.7	7.46				
B	38	0.4	114.16	1195	7.09				
C	1	19	772.1	606	7.00				
D	7	13	1126.1	11818	7.27				
E	17	5	1164.1	11314	7.96				
F	8	18	1153.0	1111	7.84				
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Melting Shc									
Pd	Weeks Worked	Exp-rt of Life	Output		Total				
			This Week	Last Week	This Week	Last Week	This Week	Last Week	
A	31	1	110.3	112.7	7.46				
B	38	0.4	114.16	1195	7.09				
C	1	19	772.1	606	7.00				
D	7	13	1126.1	11818	7.27				
E	17	5	1164.1	11314	7.96				
F	8	18	1153.0	1111	7.84				
Total on Average 1108.2 6011 7.84									
<div> <div>13-2-2021</div> <div>J. N. KILBY, Esq. General Manager</div> </div>									
Melting Shc									
Pd	Weeks Worked	Exp-rt of Life	Output		Total				
			This Week	Last Week	This Week	Last Week	This Week	Last Week	
A	32	1	110.3	112.7	7.46				
B	38	0.4	114.16	1195	7.09				
C	1	19	772.1	606	7.00				
D	7	13	1126.1	11818	7.27				
E	17	5	1164.1	11314	7.96				
F	8	18	1153.0	1111	7.84				
Total on Average 1108.2 6011 7.84									
<div> <div>20-2-2021</div> <div>J. N. KILBY, Esq. General Manager</div> </div>									
Melting Shc									
Pd	Weeks Worked	Exp-rt of Life	Output		Total				
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A	33	1	110.3	112.7	7.46				
B	38	0.4	114.16	1195	7.09				
C	1	19	772.1	606	7.00				
D	7	13	1126.1	11818	7.27				
E	17	5	1164.1	11314	7.96				
F	8	18	1153.0	1111	7.84				
Total on Average 1108.2 6011 7.84									
<div> <div>27-2-2021</div> <div>J. N. KILBY, Esq. General Manager</div> </div>									
Melting Shc									
Pd	Weeks Worked	Exp-rt of Life	Output		Total				
			This Week	Last Week	This Week	Last Week	This Week	Last Week	
A	34	1	110.3	112.7	7.46				
B	38	0.4	114.16	1195	7.09				
C	1	19	772.1	606	7.00				
D	7	13	1126.1	11818	7.27				
E	17	5	1164.1	11314	7.96				
F	8	18	1153.0	1111	7.84				
Total on Average 1108.2 6011 7.84									
<div> <div>3-3-2021</div> <div>J. N. KILBY, Esq. General Manager</div> </div>									
Melting Shc									
Pd	Weeks Worked	Exp-rt of Life	Output		Total				
			This Week	Last Week	This Week	Last Week	This Week	Last Week	
A	35	1	110.3	112.7	7.46				
B	38	0.4	114.16	1195	7.09				
C	1	19	772.1	606	7.00				
D	7	13	1126.1	11818	7.27				
E	17	5	1164.1	11314	7.96				
F	8	18	1153.0	1111	7.84				
Total on Average 1108.2 6011 7.84									
<div> <div>10-3-2021</div> <div>J. N. KILBY, Esq. General Manager</div> </div>									
Melting Shc									
Pd	Weeks Worked	Exp-rt of Life	Output		Total				
			This Week	Last Week	This Week	Last Week	This Week	Last Week	
A	36	1	110.3	112.7	7.46				
B	38	0.4	114.16	1195	7.09				
C	1	19	772.1	606	7.00				
D	7	13	1126.1	11818	7.27				
E	17	5	1164.1	11314	7.96				
F	8	18	1153.0	1111	7.84				
Total on Average 1108.2 6011 7.84									
<div> <div>17-3-2021</div> <div>J. N. KILBY, Esq. General Manager</div> </div>									
Melting Shc									
Pd	Weeks Worked	Exp-rt of Life	Output		Total				
			This Week	Last Week	This Week	Last Week	This Week	Last Week	
A	37	1	110.3	112.7	7.46				
B	38	0.4	114.16	1195	7.09				
C	1	19	772.1	606	7.00				
D	7	13	1126.1	11818	7.27				
E	17	5	1164.1	11314	7.96				
F	8	18	1153.0	1111	7.84				
Total on Average 1108.2 6011 7.84									
<div> <div>24-3-2021</div> <div>J. N. KILBY, Esq. General Manager</div> </div>									
Melting Shc									



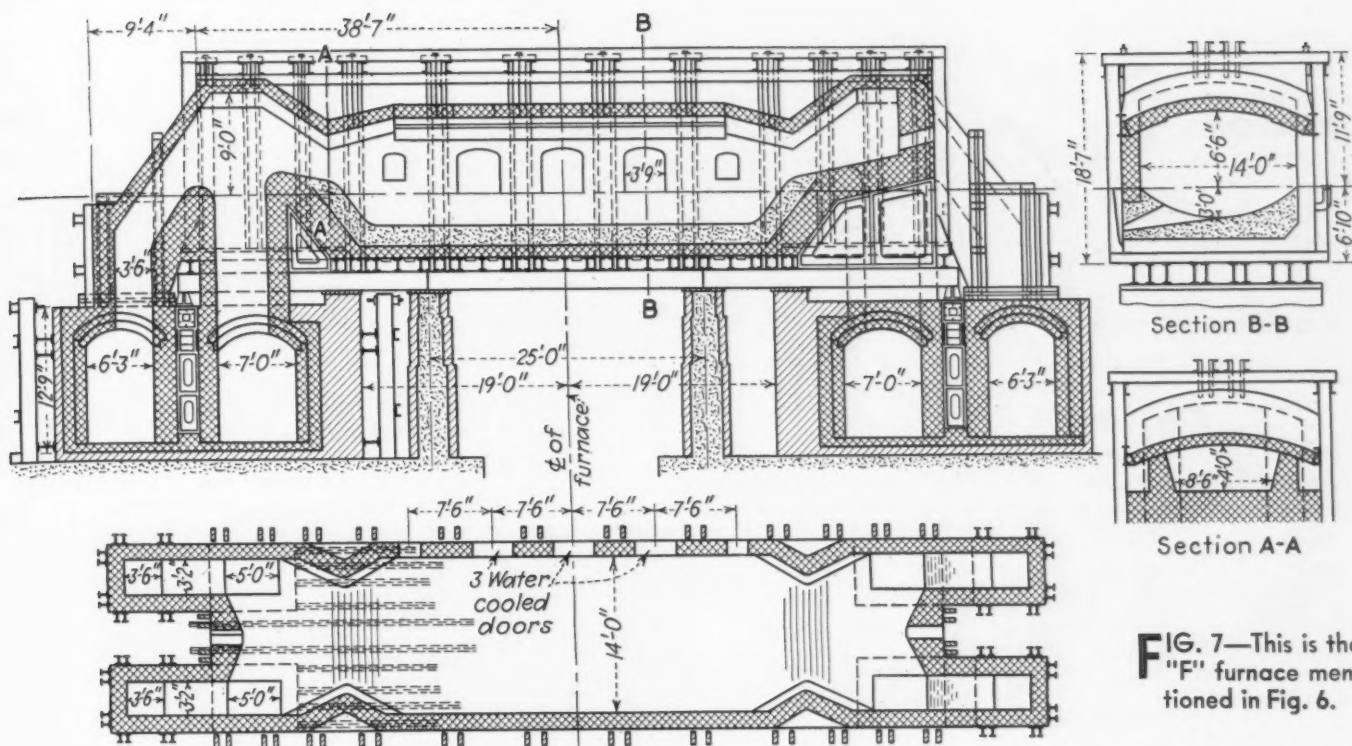


FIG. 7—This is the "F" furnace mentioned in Fig. 6.

The roofs are the sprung arch type, ribbed and in rings. The bricks are all keys, instead of the usual wedge shape for silica, and the ribs are made up of two rings. The ribs are spaced four to six bricks apart. The joints of each adjacent ring are bonded by the use, in every alternate ring, of  $1\frac{1}{2}$  width bricks next to the skewback. Metal liners of 20 gage black iron are used between all of the joints. The usual rise of 1.5 to 1.6 in. per ft. of span is desirable. See Fig. 9.

It is important that the distance from the transverse center line of the furnace to the knuckles is accurate at all four points, otherwise the rings cannot be straight across and extra strains are put on the bricks in certain areas.

Brick laying is started in the center of the furnace and any irregularity in the binding or skewback channels is taken up at the ends of the furnace over the up-takes. Keying of the arches is done at three points and the keys should drive easily.

The most novel features of the roof are that it is held down to its original cold shape by a rigid superstructure, and the expansion and the rotation of the skewback are taken care of by suspending the skewback supports from the superstructure, and holding the back skewback support away from the

buckstays by means of heavy volute springs outside the buckstays.

This arrangement is shown on Figs. 1, 2 or 3.

The suspended skewback support is not uncommon practice with silica roofs. In this case, however, the back skewback support is spaced with wooden blocks 3 in. toward the center of the furnace while the roof is being laid.

Between the buckstays there is a metal form which extends from the skewback support to outside of the buckstays and has a loose fit between the buckstays. This form transmits the tension from the spring to the skewback support. Details of spring arrangement are shown on Fig. 10.

A detail of the spring itself is shown in Fig. 11.

This is a volute spring of five coils, 9 in. outside diameter at the base and  $2\frac{3}{4}$  in. inside diameter at the top. It is made from  $6 \times \frac{5}{8}$  in. spring steel. It requires 35,000 lb. to close this spring. The spring size, however, depends upon the weight of the roof and the spacing of the springs. This spring is the one used in Australia.

In cases where the buckstay arrangement is such that a fairly uniform spring loading could not be obtained, cross members can be fastened between the buckstays, and the springs, uniformly located along these, as shown in Fig. 12. This

arrangement was made for a tilting furnace where the buckstay spacing and arrangement would not otherwise permit springs.

Across each rib of the roof is placed a 5-in. or 6-in. channel, bent to the radius of the ribs when the roof is cold. Running longitudinally to the furnace, and resting on these channels are five 6-in. I-beams. There are pieces of plate welded to the channels to prevent these I-beams from slipping. These beams are spaced to give approximately uniform pressure on the channels.

Across the furnace, and fastened to the cross ties or the buckstays, is a plate construction, the lower side of which is cut to the curvature of the roof and located about 9 in. above the ribs. On the bottom of this  $\frac{1}{2}$  in. plate is fastened a  $5 \times 5 \times \frac{1}{2}$  in. angle which is tapped for 1 in. diameter hold-down bolts, located so that they will turn down on to the longitudinal I-beams. This provides the hold-down arrangement for the roof. See Figs. 13 and 3.

To provide for a free movement of the back skewback during the operation of the furnace, it is essential that the expansion of the walls upward will not cause them to come into contact with the skewback. Ample provision for this expansion is, therefore, made in laying the walls, and the open space between the walls and skewback is

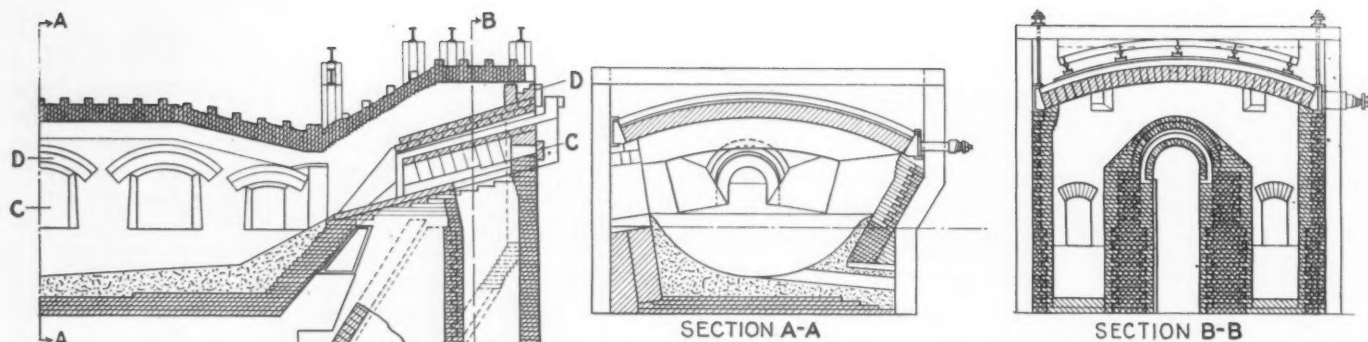


FIG. 8—Details of the No. 1 furnace at Newcastle, Australia, are shown here.

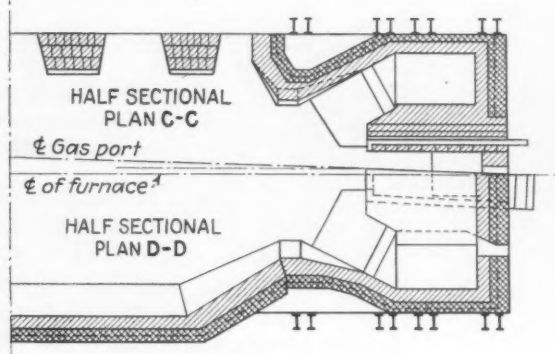


Fig. 9—Details of roof construction are shown here.

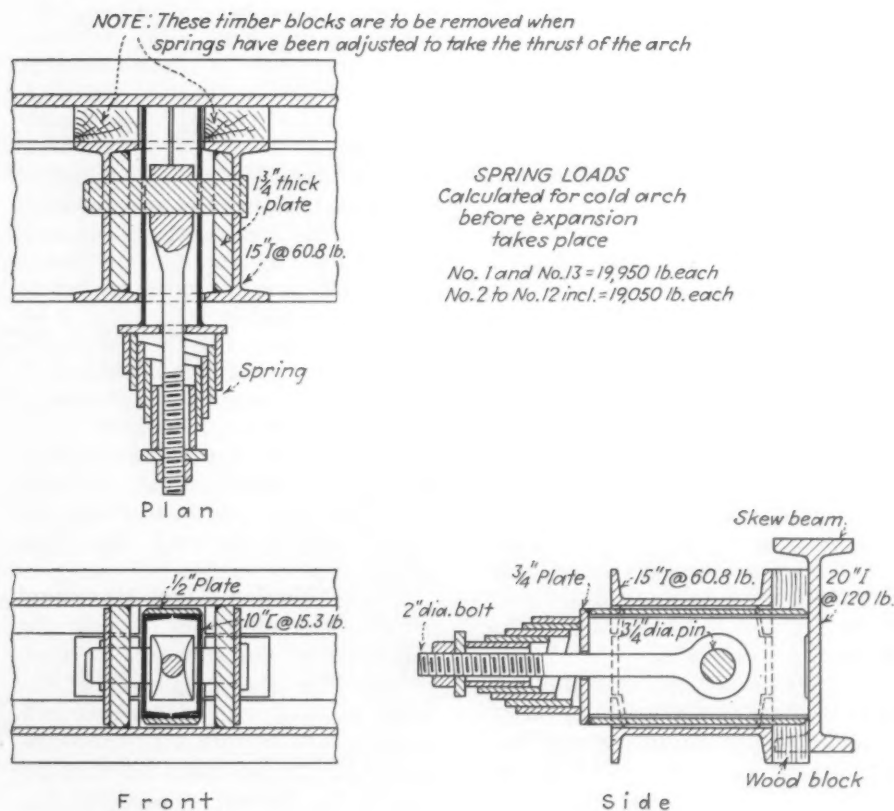


Fig. 10—Details of the spring arrangement.

filled with loose magnesite or chrome ore, which will crush out during heating up.

#### Starting the Furnace

When the roof is laid, all of the hold-down bolts are loosened. The nuts on the ends of the spring bolts are tightened until the wooden spacing blocks between the buckstays and the back skewback support are loose. These blocks are then removed and the entire thrust of the roof is on the springs.

During the heating up operation, which is the same as good practice for silica roofs, the crown of the roof is not permitted to rise more than, say, 1 in. No rise at all is more desirable. When there is a rising tendency noted, the nut on the spring bolt is loosened about half a turn. It takes 1 hr. or more for this to be effective.

When the furnace is up to temperature, the hold-down bolts are then turned down to a hand-tight contact with the longitudinal I-beams on the roof. No further attention to the springs or hold-down bolts is necessary until the furnace comes off for repairs. At this time the reverse procedure takes place,



except that the hold-down bolts are not touched.

Any tendency of the roof to sag during the cooling is taken care of by tightening the spring bolts.

The writer has found it a convenience to measure the length of the springs, when the furnace is first up to temperature, and to paint this somewhere on the structure where it will stay. This will always serve as a guide as to where the start was made, in case of later confusion from change of personnel or loss of records, or any other cause.

A little later it will be shown that this construction meets the essential conditions necessary to adequately provide for the characteristics of the bricks used.

### Ends

The uptakes, side and end walls, are laid in any approved manner. Such construction out of basic bricks is not uncommon. The basic bricks, however, are carried clear down to the slag pocket arches and, where the basic bricks join the silica brick arches, the basic bricks extend beyond the silica bricks 1 to 2 in. In the uptakes, the roof quality bricks need only be used for facing and they can be backed up with less expensive bricks of approximately the same composition such as, for example, chemically bonded bricks.

### Mortar

One consideration, which should really apply to basic bricks used anywhere, is that no free water should be used in the mortar and joints should be very thin. For new brick work, 100 parts of magnesite mixed with about 20 parts of oil produces a good mortar. Any kind of oil such as linseed, cottonseed, waste lubricating oil, etc., will do. For comparatively hot work, a mortar from about 3 gal. of waterglass, specific gravity 1.16, per 100 lb. of ground magnesite is satisfactory; but the temperature of the furnace must be high enough to immediately volatilize the water which has been added to the waterglass. A magnesium sulphate solution mixed with ground magnesite is also a satisfactory mortar for temperatures where the moisture will be quickly driven off.

### Other Furnace Parts

When the life of the roof is increased to 18 months, it is obvious that unless other changes are made

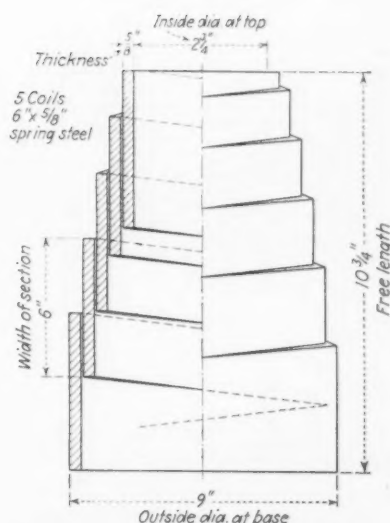


FIG. 11—Here are shown details of the spring itself.

in design and operation, 18 months' continuous production cannot be obtained. Furnaces with silica roofs are so designed and operated today that the component parts such as slag pockets, checkers, runners, etc., will not cause a delay for repairs or cleaning during the life of the roof—say on an average 350 heats or 6 to 7 months' operation. I quote again from Mr. Chesters' paper in which he states, "Where such long roof life is obtained, it is clear that cleaning of the checkers will require a shut-down long before the roof fails."

This is the case in England and Germany. Several shut-down periods are necessary for each basic roof because of checkers. These shutdowns, or even a diminished production rate, for reasons other than the basic roof failure are unnecessary and are readily avoidable.

With basic roofs and basic ends, the slag pocket problem is eliminated. Slag pockets constitute probably the most important problem in the repair of a silica roof furnace. Slag pockets have been widened and deepened and finally brought to a size which will hold all of the slag which has been formed during the life of the roof. In many cases slag pockets are still inadequate for more than 350 to 400 heats.

In the rebuilding of a silica furnace, the slag must first be removed from these pockets before brick work can be started on the uptakes. As everyone knows, this is slow, tedious work. It requires less than 24 hr. to put a new roof on a furnace; but removing the slag and, after that, building the uptakes delays the resumption of operations to about a 10-day repair period.

Contrary to common thought, there is little or no slag carried over into the slag pockets from the fur-

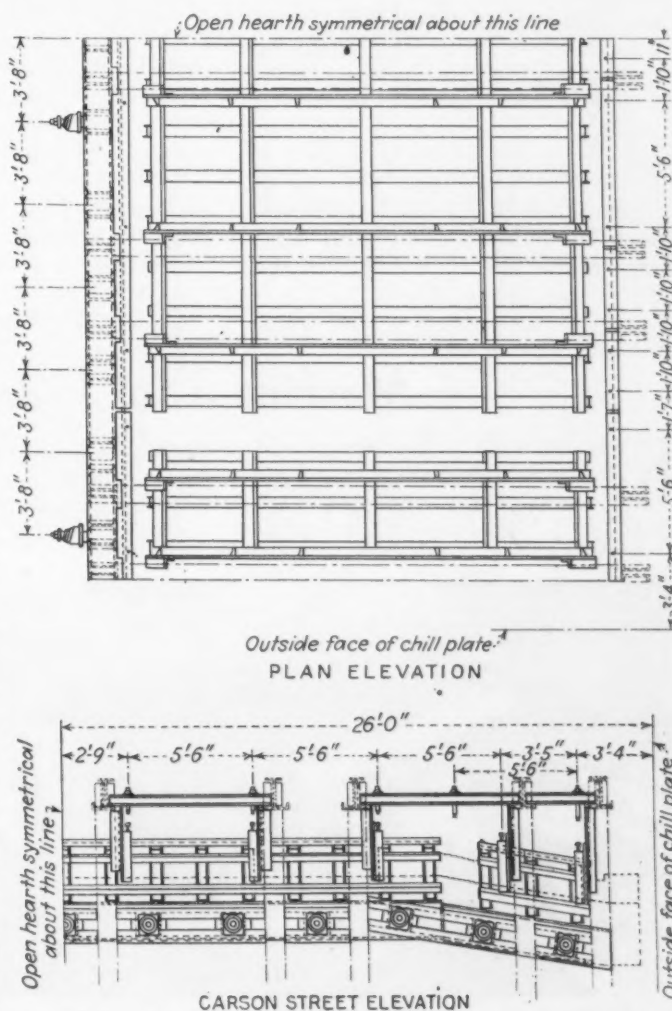


FIG. 12—Cross members can be fastened between the buckstays and the springs uniformly located along these.

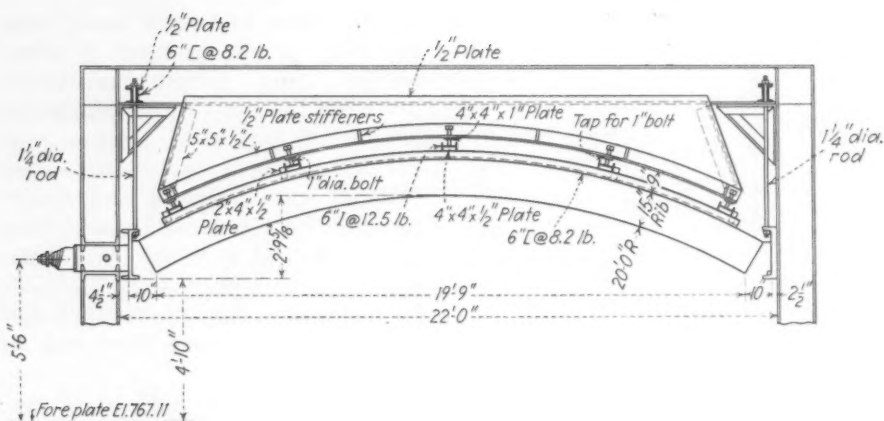


Fig. 13—Hold-down arrangement for the roof.

nace. What is carried over is principally iron oxide fumes and occasionally fine lime, where burnt lime is used, or fine dolomite. This carry-over reacts with the silica bricks forming, at comparatively low temperature, fusible silicates which constitute the slag found in slag pockets. Typical analysis of such slag is:

SiO <sub>2</sub>	36.6 per cent
FeO	5.6 per cent
Fe <sub>2</sub> O <sub>3</sub>	38.8 per cent
Al <sub>2</sub> O <sub>3</sub>	2.2 per cent
MnO	4.1 per cent
CaO	6.1 per cent
MgO	3.3 per cent
Cr <sub>2</sub> O <sub>3</sub>	2.3 per cent

The failure of these basic bricks comes about by a slow spalling off of the exposed surfaces. Iron oxide apparently combines with the

chrome, which causes a swelling, which, in turn, brings about this spalling. The product of this spalling is a material which is highly refractory. As it forms in the brick work of the roof and the uptakes and then spalls off, it falls off into the slag pockets in granular form and does not coalesce. It can, therefore, be scraped out of the slag pockets with rabblers, without interfering with the operation of the furnace. This should be done about once a month.

If the material is allowed to remain too long, it will, due either to plastic flow or pressure, coalesce to a certain extent, and will then have to be broken up with bars before it can be scraped out. In England some plants have taken this mate-

rial and used it for patching jambs, etc. A typical analysis of this slag pocket accumulation is:

SiO <sub>2</sub>	3.2 per cent
FeO	nil
Fe <sub>2</sub> O <sub>3</sub>	88.0 per cent
Total iron	61.6 per cent
Al <sub>2</sub> O <sub>3</sub>	1.7 per cent
MnO	2.8 per cent
MgO	1.3 per cent
CaO	2.8 per cent
Cr <sub>2</sub> O <sub>3</sub>	trace
Melting point	2818 deg. F.

From a furnace with basic ends but with a silica roof over the ends, the slag pocket material analyzed:

SiO <sub>2</sub>	11.1 per cent
FeO	11.7 per cent
Fe <sub>2</sub> O <sub>3</sub>	65.0 per cent
Total iron	54.6 per cent
Al <sub>2</sub> O <sub>3</sub>	2.4 per cent
MnO	4.5 per cent
CaO	2.0 per cent
MgO	3.2 per cent
Cr <sub>2</sub> O <sub>3</sub>	trace
Melting point	2556 deg. F.

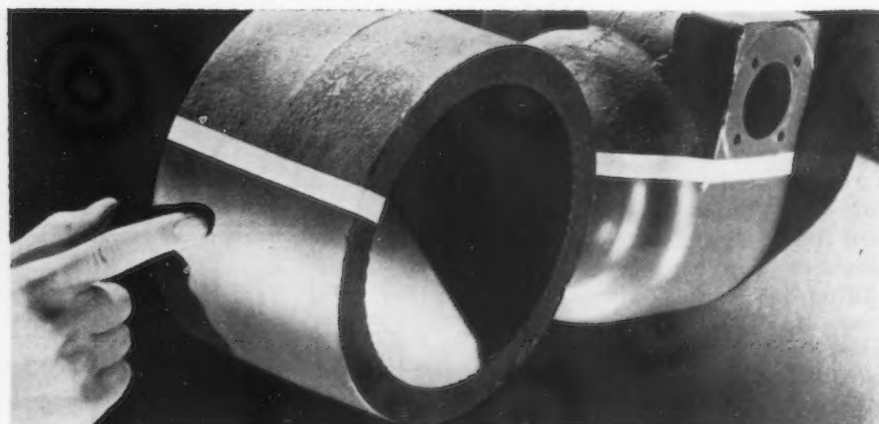
This has coalesced into a spongy mass and had to be dug from the furnace, although it was not nearly as hard to remove as the slag from a silica furnace. Large slag pockets with basic furnaces are, therefore, unnecessary and by a systematic cleaning the life of the slag pockets can be prolonged indefinitely and the time required for a furnace repair is only from two to four days, instead of 10 to 12 days.

*Ed. Note:—Next week the author concludes with data on checkers, checker temperature control, the economics of basic construction, etc.*

## Machine Tool Enamel Finish Dries Fast

**K**EM machine tool enamel, said to be a new and faster synthetic enamel for machine tool castings, is expected to aid manu-

facturers who are either not set up for lacquer work or who need a more resistant finish for their products.



**T**HIS typical machine tool casting shows the Kem machine tool enamel four coat finish on the lower portion, as compared with original form of the casting on the upper portion.

Made by Sherwin-Williams Co., Cleveland, this new finish is claimed to cut considerably the finishing time required on large tools and to give far greater resistance to cutting compounds.

Compared with the oil enamel method, said to require from 1½ to 4 days, it is claimed that four coats of the new Kem finish can be applied in 5¾ to 8½ hr., permitting work to be shipped the same day it is finished and assembled.

A typical drying schedule for Kem is:

	Drying Time
First: Spray or brush coat, zinc chromate primer	15 to 30 min.
Second: Machine filler	4 to 5 hr.
Third: Kem sealer gray	15 to 30 min.
Fourth: Kem machine tool gray	15 to 30 min.
Dry and crate	1 to 2 hr.



## How to Avoid

# Poor Fitup in Arc Welding

By WALTER J. BROOKING

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R. G. LeTourneau, Inc.,  
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ONE of the most important factors in the cost of arc welded machinery, and one which is most often underestimated, is that of fitup. There is probably no other single factor which exerts as great an effect upon the amount of labor required to produce a given welded structure as does the degree of perfection of the fitup of the parts.

The relative costs of a joint whose component parts fit well and of a joint where the parts fit badly is rather easily illustrated by a simple geometric analysis of the volume of weld metal usually used to passably weld the joint. Fig. 1 shows two  $\frac{3}{8}$ -in. fillet welds fusing one plate to another, assuming a good fitup. Fillet joints are shown because a large majority of welded joints are of the fillet type. The same principles apply to other types of joints. Fig. 2 shows the same joint with a gap equal to half the thickness of the thinnest plate—not an uncommon degree of bad fit in many joints unless special effort has been expended to improve fitup.

The amount of weld metal an average operator will deposit in such a joint is indicated. By volume alone, assuming that the joint is welded as shown, the total weld metal used is slightly over two and one-half times the amount required if the joint fit properly as shown in Fig. 1. Even assuming that the operator welded the gap full, and then extended the leg of the weld only  $\frac{3}{8}$  in. along the  $\frac{1}{2}$ -in. plate (indicated by the dotted line in Fig. 2), he would use twice the volume of weld metal that he would use if the fit were proper. Few welding engineers would allow

much less weld metal to be used in such a case; and since the average operator is no qualified engineer, but generally has an honest desire to be on the safe side in the interest of good workmanship, he will usually deposit more rather than less metal in such a joint as shown in Fig. 2.

Considering the fact that deposited weld metal seldom costs less than \$1 per lb. even in factories whose operations are standardized and repetitive, and that the cost per lb. deposited for field welded structures is usually considerably more; and considering that labor is a large factor in that dollar or more per lb., the cost of depositing two or more times the amount of weld metal per joint than is required can readily be appreciated. It simply doubles, or more than doubles, the cost.

Fig. 3 shows the same type of misfit joint as Fig. 2, except that the gap between plates is equal to the thickness of the thinnest plate. Such gaps are not quite as common as a gap equal to half the thickness of the thinner member of a joint, yet an examination of even a relatively simple welding composed of several parts, especially if they are irregular in shape, often reveals a surprising number of inches of joints with gaps equal to the plate thickness.

A gap of this size is much more of a problem from the operator's standpoint than one half as large.

From the standpoint of volume, if the joint is welded as shown extending the lower leg  $\frac{3}{4}$  in. along the plate, the joint requires five times the volume of weld metal than it would if it fit properly. Even if the joint is welded  $\frac{3}{8}$  in. along the  $\frac{1}{2}$ -in. plate (shown as the dotted line), the joint requires at least three times the volume of weld metal that it would if it fit properly. Common practice would seem to be to deposit more nearly five times the volume required for a good fitting joint in the case of such a gap.

In addition to the greatly increased volume of metal deposited, other costly factors enter the filling of such a gap. First, there is sometimes a temptation to put a slug in the gap and try to fuse it to both members of the joint. This is bad practice because it is seldom that a satisfactory bond can be obtained on all sides of the slug. Second, if the operator fills it with weld metal as he should, it is always difficult to clean the slag off each pass, and the process is further slowed down by the fact that the members of the joint are not near enough together to carry off the heat from a normal weld, to say nothing of the additional metal needed first to span the gap. Third, the additional heat and mass of weld metal often causes an unusual amount of distortion which may cause trouble in the machining or assembly of the structure or may otherwise deter

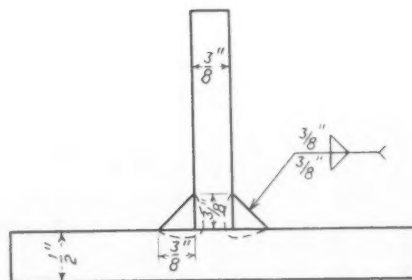
from the quality of it in use. Fourth, the added heat frequently causes excessive grain growth in the fusion zones of the joint which markedly reduces the strength of the structure, predisposing it to probable fatigue failure if any undercut is left at the fusion zone and any bending stresses are exerted on the joint. The cost, therefore, of welding a gap equal to the thickness of the thinnest member of the joint can almost always be considered to be not less than four times (and usually much more than four times) the cost of welding the same joint if it fits properly.

In the interest of accurate estimates of costs of production, a very realistic attitude toward degree of good fitup must be taken by any producer of welded goods. It is entirely possible for the manufacturer of machines in lots of 25 or more of the same model to reduce the normal amount of bad fits encountered in the first unit (or even the first pilot order of five or 10 units) to almost no bad fits for his larger quantity production. This can be done by making effective use of the first order of each new model to make accurate setup fixtures and accurate cutting, shaping and forming templates; and second, by training the workmen who use these templates and setup the parts for welding in the practice of good workmanship.

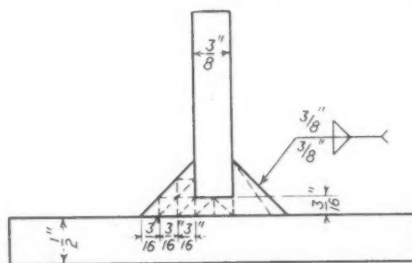
#### Correction of Templates Necessary

The correction of templates to conform to the fixtures and parts which were modified or adjusted in building the first experimental unit of a new model machine is of prime importance. If the changes which the experimental department almost always have to make on at least some parts of a new model machine are not accurately and completely carried over as changes on the cutting and forming templates for those parts before the parts for the first "pilot" quantity order of 10 or more are cut, the truly experimental experience on the first machine has been lost, and because of bad fitup the price on the pilot quantity order will probably be high.

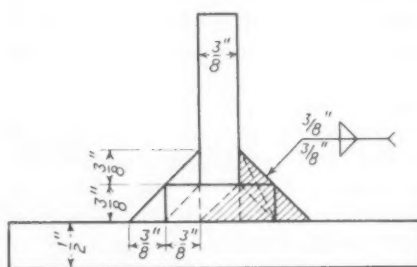
When the pilot order has been started through the shop and the first unit or two is being placed on a mass production basis by use of setup and welding fixtures, there are usually additional refinements to be made in templates to make all joints in the machine fit properly.



**FIG. 1**—With a correctly fitted joint, welds can be made to correct dimensional size according to specification.



**FIG. 2**—For purpose of demonstrating comparative costs, this bad fitup is shown with a gap equal to one-half the thickness of the thinner plate, frequently not an exaggerated condition in actual welding practice. Over twice the weld metal must be deposited as for a good fitup as shown in Fig. 1.



**FIG. 3**—A bad fit leaving a gap equal to thickness of the plate requires by ordinary welding practice about five times the weld metal required for a properly fitted joint.

o o o

These changes should be carefully followed through to completion of new templates at that time, and care should be taken to be sure that the new templates have replaced the old ones when the parts for subsequent production orders of that model are being cut and processed.

The correction of templates is most important because however

good the workmanship which may be done on material and however faithful the reproduction of parts from a template, if the template is wrong the parts are wrong, and an additional price is paid for poor fitup.

Some parts in welded machines are more likely to be misfits than others. The parts which are cut to make up the regular, box-like structure shown in Fig. 4 are much less likely to be misfits than the ones shown in Fig. 5. In the former, as long as dimensions are held accurately and cuts are made square and regular, the parts must fit if they are properly set together. A long bevel cut or the development of a bevel cut on a structural section, such as the one in Fig. 5, are much more likely to fail to fit accurately, since in the laying out on a drawing board and the development of the original template a slight deviation in the required angle may cause a surprising gap. The longer this beveled cut, the greater the likelihood of a gap occurring. Careful following through on the first experimental machine results in the reduction or elimination of serious gaps on such cuts.

The difficulty of cutting and fitting together without gaps of such structures as illustrated by Fig. 6 increases with the complexity of the curved sections, yet the most effective use of arc welding with its freedom of design and material distributing advantages causes progressive designers of many kinds of machinery to develop models more along the functional, material saving design. The "follow through" to correct templates is even more important in such units because of the greater complexity of layout and greater chance for a small error to be magnified in a large piece of material.

The machine shown in Fig. 7 is an example of a machine which takes advantage of material distribution and effective "streamlining" to make it function most efficiently. Consider the additional cost of welding such a unit if on even half of the curved or angular cuts there were a gap equal to half the thickness of the plate! Yet such a degree of perfect fitup would probably be very creditable on the first machine built. Some gaps would be wider than the thickness of the plate in all likelihood unless a much



larger amount of engineering time and money has been spent than is necessary from the standpoint of practical expediency.

#### Training Job Required

The second important factor, that of training the workmen in the shop in producing good workmanship, is primarily one of education. If the templates are substantially and accurately made, and the cutting, shaping and forming equipment are in good mechanical condition, the problem of getting accurately cut and processed parts should not be very difficult. The normal desire on the part of the average workman to do a good job in the light of his understanding of that job makes the practice of inspecting the first of each of the parts cut on an order a very effective insurance of good workmanship and accurate processing on the rest of the order. If the part is correct, it is safe to assume that the workman has mastered the requirements for that particular part, and the rest of the parts can be cut. If it is not correct in all respects, the workman and his supervisor together can analyze the problem of producing it correctly. Another part can be cut, welded and checked, and thus a satisfactory degree of perfection for the job can be worked out.

Parts such as those which make up the rather complex gear case shown on top of the welding positioner in Fig. 8 require a consistently high degree of accurate workmanship because several of them are irregular in shape in the first place and are then pressed or formed into still more complex parts before being welded. An accumulation of small errors or only one incorrectly done operation can result in gaps which can be extremely expensive; especially since the welding in this case must be 100 per cent oil tight and the heat introduced into the structure must be held to the least practical minimum to avoid distortion.

After the parts for even a simple weldment have been cut to fit properly, an accurately built and rigid setup fixture which will allow the setup man to place them quickly, securely and accurately will lend an additional and very profitable degree of insurance against bad fits.

It is not an exaggeration to

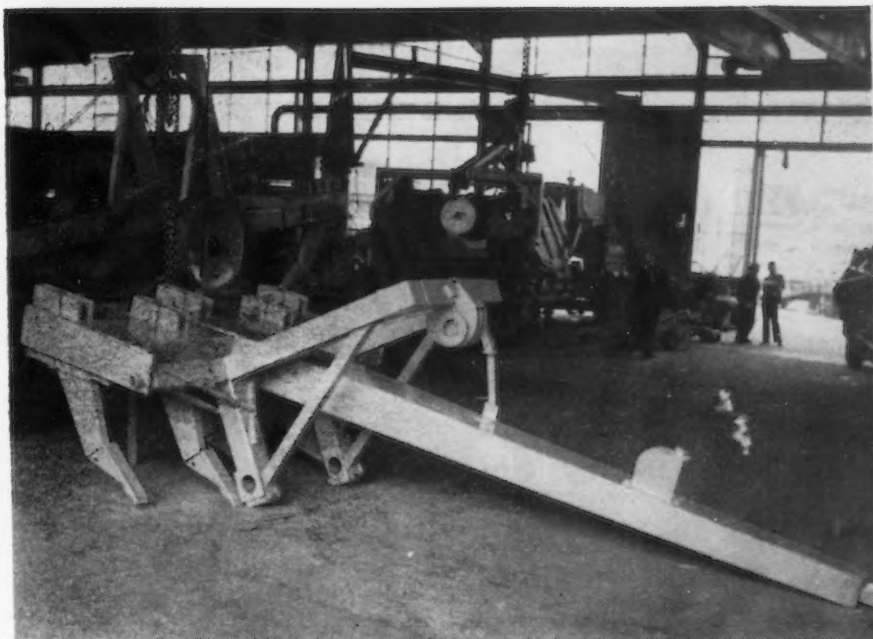
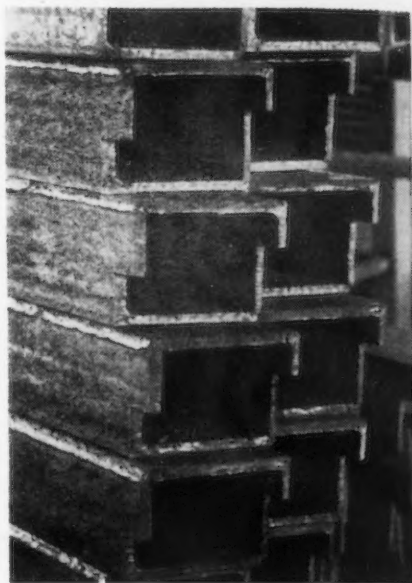


FIG. 4—The major parts of this welded machine sub-assembly are square cut or nearly square cut and therefore are readily cut to fit correctly.

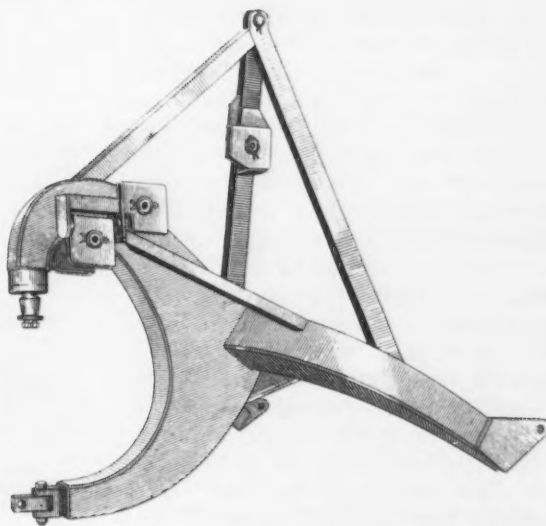


ABOVE

FIG. 5—Parts with long bevels or offset compound bevels such as those illustrated must be faithful reproductions of accurate templates if the components are to fit accurately.

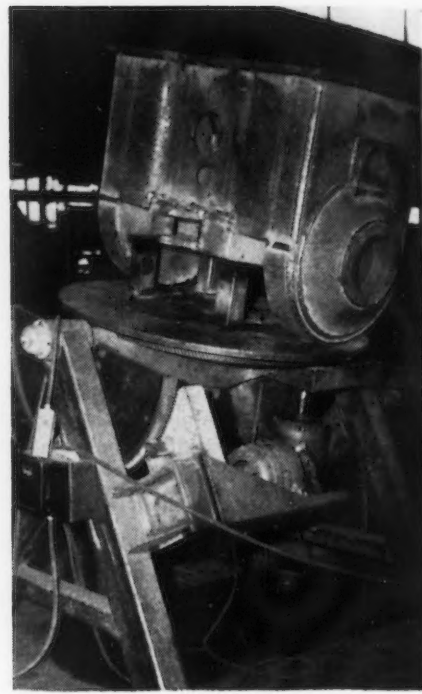
RIGHT

FIG. 6—From the point of view of design, this is a highly efficient welded structure, but all the curves used to get proper distribution of material increase the problem of obtaining perfectly fitting joints.





**FIG. 7**—The number of curved members, beveled member joints, and irregular shaped parts in this machine produces a highly efficient machine with a minimum of material, but also requires careful and complete template development from the first experimental model in order to avoid badly fitting joints which are very costly in subsequent orders on a production basis.



**FIG. 8**—Accurate, careful workmanship at every stage of cutting, shaping and setting up is essential to good fitup on this 4-ft. deep gear case.

state that a large portion of the margin of profit in the arc welded method of manufacture of machinery may lie in the perfection of the fitup of the parts. Often the best design from the functional

and from the material-economy standpoints involves the greatest problem in developing perfectly fitting parts. By intelligent and consistent "following through," by the correction of templates from ex-

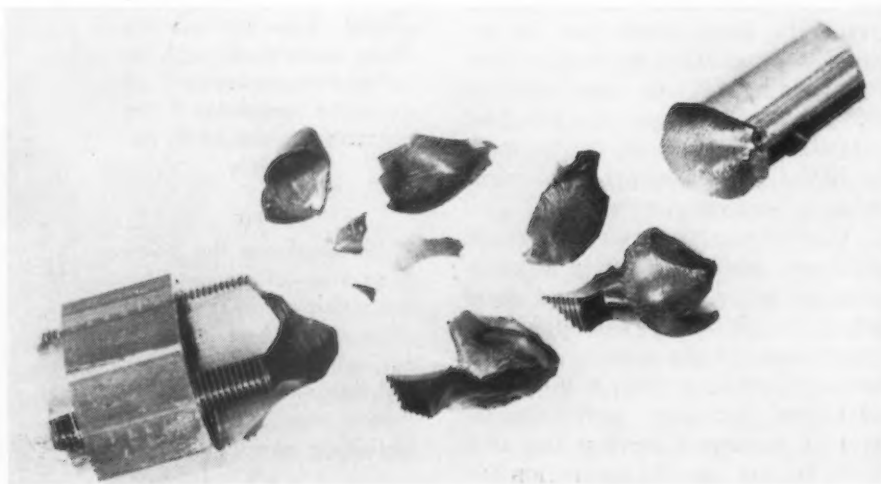
perimental model to pilot order and thence to first production order, and by exercising careful workmanship, the expense of poorly fitting parts can be reduced to a very minor factor.

## Tap Salvaged by Brazing

**B**ELIEVE it or not, this special 1 $\frac{3}{8}$ -in. tap was back in service four hours after it had broken into 10 pieces as shown. The tool maintenance department knew that welding of high speed steel was impossible but decided that low temperature brazing would do the trick. It did. All parts were first carefully cleaned and fluxed, then assembled and held closely together in a milling machine vise. Heating was done with an oxyacetylene torch and the alloy used was Easy-Flo, a medium silver hard solder flowing freely at 1175 deg. F. The exceptional penetrating qualities of this alloy let it flow throughout the many surfaces that had to be joined. The only fault detected after brazing was that the tap was 0.005

in. out of center, but this made no great difference on the job being

done. The repaired tap was still in use three months later.





# Machinability vs. Microstructure

## Of Aircraft Carburizing Gear Steels

OF the many low carbon alloy steels used for carburized gears and pinions, two grades are preferred where maximum strength and shock resistant characteristics are desired. These two grades are SAE 2515 nickel carburizing steel and SAE 3312 nickel chrome (Krupp) carburizing steel. SAE 2515 steel has freedom from scaling and distortion, low quenching temperatures, and relatively good machining properties. When carburized and hardened, it has high wear and fatigue resistance in the case and high core strength. It is used for arduous service which demands toughness to resist shock, strength to withstand heavy loads, and a highly wear resistant tooth surface. SAE 3312 steel has a higher quenching temperature and air hardening tendencies. It is not as readily machinable as other carburizing steels. When carburized and hardened, it also has a high wear and fatigue resistant case and a high core hardness.

Nickel alloy carburizing steels are deservedly popular for important gears, combining as they do, dependability and uniformity, low hardening temperatures and response to mild quenching, with resulting reduction in warping, scaling, distortion and internal stress, resistance to grain growth and embrittlement, and superior mechanical properties of both case and core.

The typical physical properties of the cores of 1-in. bars of both of the above steels after carburizing and hardening are shown in Tables I and II.

The principal factors to be considered in determining the rate at

THE authors show that a satisfactory microstructure for good machinability in automatics and lathes, where roughing cuts are taken, may be totally undesirable for finish gear cutting when thin cuts are taken. Experiments conducted on two high-nickel carburizing steels, SAE 2515 and 3312, indicate what intermediate heat treatments are necessary to change the structure sufficiently to obtain the desired finish on gear teeth. Account is also taken of some of the substitute materials available in view of the nickel shortage. These data were originally presented in the form of a paper before the American Gear Manufacturers Association. See also the two articles by Dr. Woldman on "Relations Between Microstructure and Machinability of Alloy Steel Gear Steels," THE IRON AGE, June 19 and 26.

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and

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which various carburizing steels can be machined are ductility, strength and the amount and distribution of the free ferrite (carbonless iron).

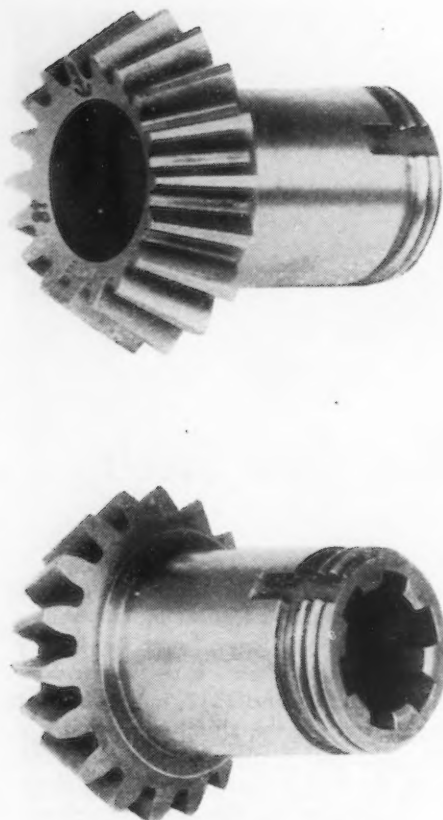
Ductility, as indicated by per cent elongation, controls the extent to which the chips will cling to the tool; while strength of the steel, as indicated by tensile or hardness values: affects the power required to thrust the cutting tool under the chip. Soft, ductile ferrite is a sticky, gummy constituent which is difficult to cut. The amount of the free ferrite increases with decreasing carbon content. The greater the amount of free ferrite, the greater the tendency for the chips to ball up on the tool, thus causing the material to tear and increasing the difficulty of obtaining a good surface finish.

Both SAE 2515 and SAE 3312 carburizing steels show on micro-examination a large amount of free ferrite due to the very low carbon content. This free ferrite may exist

as equiaxed or distorted grains depending on the completeness of the annealing operation, and it may exist in layers or bands (Figs. 2A and

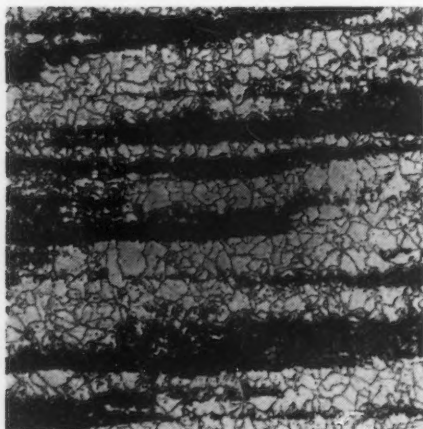
4A) depending on the hot rolling and annealing temperatures. The pearlite, which is the carbon-containing constituent, tends to break up the continuity of the free ferrite, thereby improving the machinability.

In manufacturing gears and pinions from SAE 2515 or SAE 3312 steels, careful consideration must be made of all the machining operations in addition to the hardness, strength and microstructure of the purchased steel. Assuming that the tool steels, cutting oils and machine tools have already been standardized in the factory for the particular gear, there is a strong relationship between the microstructure and each machining operation for maximum machinability. In order to establish this relationship in the manufacture of



**FIG. 1**—Finish machined bevel pinion made of SAE 2515 five per cent nickel steel.

aircraft gears machined from these two high alloy carburizing steels, we made a study of the effect of microstructure on the machinability and surface finish. The character of the microstructure is determined by the heat treatment to which the steel is subjected. This study was made on a production run while manufacturing a bevel type pinion from SAE 2515 steel and an internal spline gear from SAE 3312 steel. The bevel type pinion was finish machined *before* carburizing, while the internal spline gear was finish machined *after* carburizing.



### Operations on Bevel Pinion

The steel used on this production run of about 1000 pinions was a lot of 2 in. diameter cold drawn, normalized and annealed bar stock checking 179 to 197 Brinell hardness. The chemical analysis showed 0.15 per cent carbon, 0.45 manganese, 0.016 phosphorous, 0.021 sulphur and 5.08 nickel. The microstructure showed a uniform distribution of ferrite and pearlite, typical of a properly normalized and annealed condition. The finished gear is shown in Fig. 1.

The operations in the manufacture of this pinion were as follows:

Rough machine—Cleveland 3¾-in automatics

Face bevel—Porter Cable lathe

Gash teeth—Gleason gear cutter

Finish teeth—Gleason gear cutter

Carburize and harden

In the automatics the sequence of operations was as follows:

Finish form bevel	Counterbore
Rough form	Chamfer
Bore	Ream

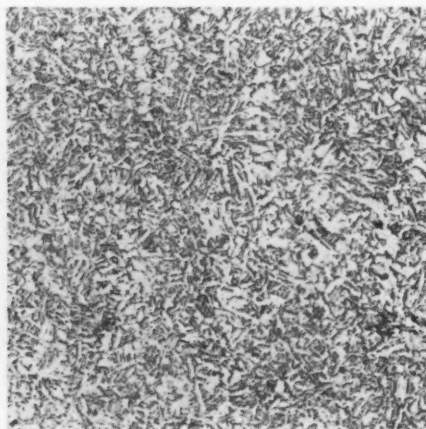
Cut-off

In the Cleveland automatics a standard sulphur base cutting oil was used in machining these pinion blanks. The cutting tools were made from 5 per cent cobalt high speed steel. All the resulting chips were bright. Approximately 300 pieces were machined per grind of tools.

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**FIG. 2**—Microstructures of SAE 2515 steel. **A**—Undesirable banded structure as received, 100 diameters. **B**—Normalized and annealed structure suitable for rough machining in automatic bar machines, 100 diameters. **C**—Normalized and partially spheroidized by annealing, a very undesirable structure for finish gear cutting, 200 diameters. All etched in 3 per cent nital.

(Reproduced about 70 per cent of original microphotograph size)



From the automatics the blanks go to the Porter Cable lathes for facing the bevels, then to the Gleason gear cutters for gashing and finishing the gear teeth. However, since the machining performed on the Porter Cable lathe and the gear cutting on the Gleason produce final dimensions with very close and exact tolerances, it is necessary to introduce an intermediate heat treating operation to relieve the high stresses introduced in the automatics. If these stresses were not relieved, the final hardening heat treatment would result in pinions distorted beyond the allowable limits.

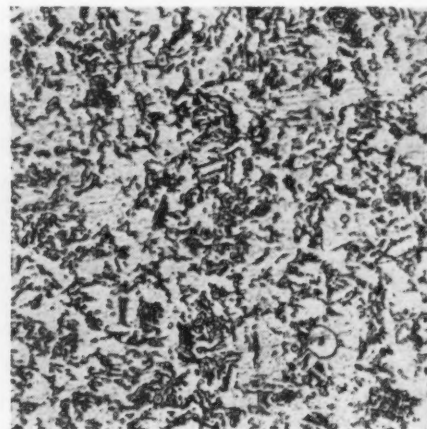
The microstructure desired for machining in the automatics is as shown at B in Fig. 2. The white areas are ferrite grains and the black areas are the pearlite grains. This seems to be the most desirable structure for machining operations in the automatics. At A in Fig. 2 is shown a typical undesirable banded structure; alternate bands of free ferrite (white) and pearlite (black). It is obvious that tears will result readily as the cutting edge of the tool moves along these bands of soft ferrite. At C is shown a partially spheroidized structure which may be satisfactory for the automatics but very undesirable for finish gear cutting when thin cuts are taken.

In order to establish the proper condition of the steel for the next operations, a large number of the gear blanks from the automatics were taken and divided into four lots, heat treated as follows:

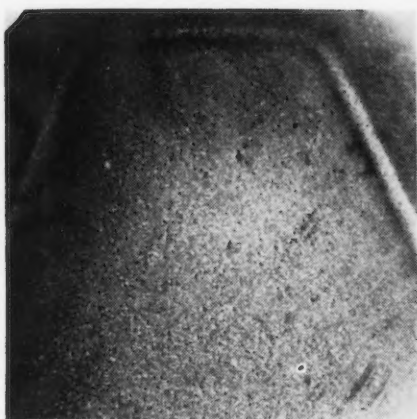
Lot A: Stress relief annealed by heating to 900 deg. F., holding at 900 deg. F. for 2 hr. and furnace cooling.

Lot B: Box annealed by packing in spent carburizing compound, heating to 1500 deg. F. and furnace cooling.

Lot C: Annealed by heating to 1500 deg. F., cooled in lime to black heat (300 to 400 deg. F.), then





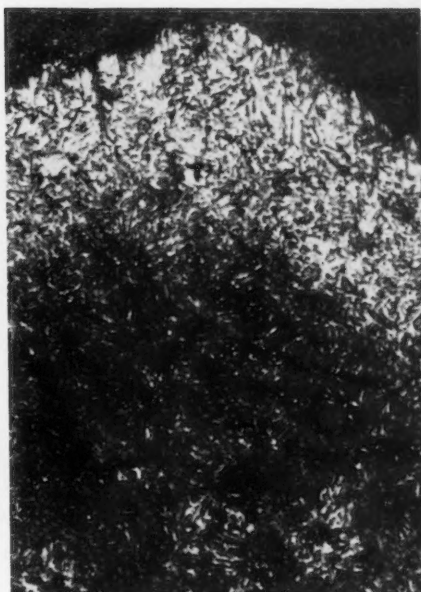


**FIG. 3**—Profile view (50 diameters) of gear tooth showing white layers of retained austenite, which is soft. The area below the white layer is hard martensite which is desired in the outer fibers also. This soft skin can be eliminated by accelerated age hardening at extremely low temperatures.  
(Original microphotograph slightly reduced)

quenched in water to 16 to 18 Rockwell C hardness.

Lot D: Quenched and tempered by heating to 1500 deg. F., quenching in oil and tempering with a long soak to 16 to 18 Rockwell C.

All four lots were machined in the Porter Cable lathe for facing of the bevels. The tools were re-ground after facing each lot. Since this turning operation with a single point tool was performed dry, the chips from all four lots were discolored. However, best results, as far as tool life and surface finish, were obtained with Lot A which retained the original grain structure after the stress-relief anneal heat treatment. The chips from Lots B, C and D were hotter and somewhat more discolored than from Lot A. Therefore, a normalized and annealed material having a hardness around 8-13 Rockwell C (179-197 Brinell) was best for the bevel facing operation on the Por-



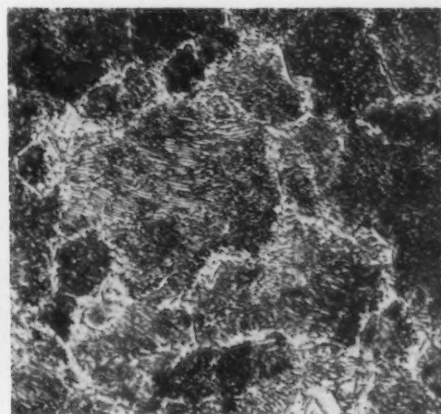
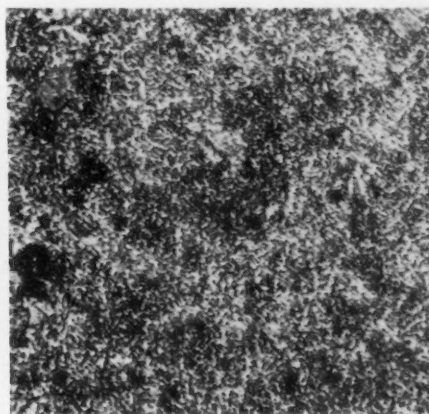
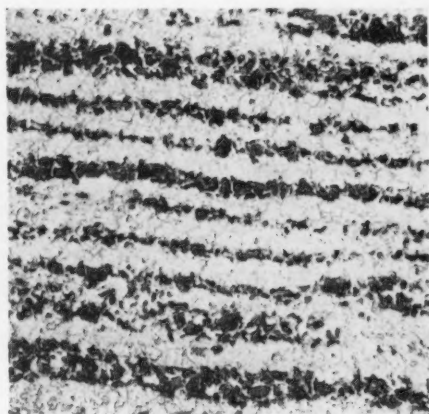
**FIG. 4**—(Left) Character of the white martensitic layer of the outer faces of the tooth shown in Fig. 3, at 300 diameters. (Right) The character of the hard martensitic crystals below the soft austenitic skin is quite pronounced at this high (750 diameters) magnification. Etched in three per cent nital.  
(Original microphotograph reduced slightly)

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BELOW

**FIG. 5**—Microstructures of SAE 3312 3 1/2 per cent nickel steel: Left: Typical banded structure of bar stock as received from the mill, at 100 diameters. Center: Partially spheroidized structure of the carburized case after annealing and a very slow cooling. This structure is unsatisfactory for the cutting of gear teeth and splines on the Fellows gear shaper, at 1000 diameters. Right: Satisfactory lamellar pearlitic structure of the carburized case after proper annealing for maximum machinability rating and best surface finish, at 1000 diameters. All etched in three per cent nital.

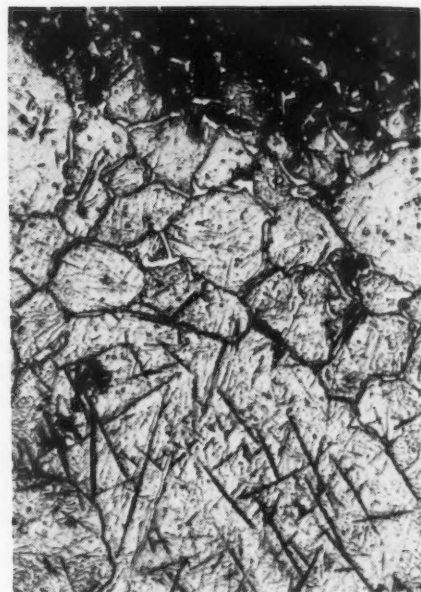
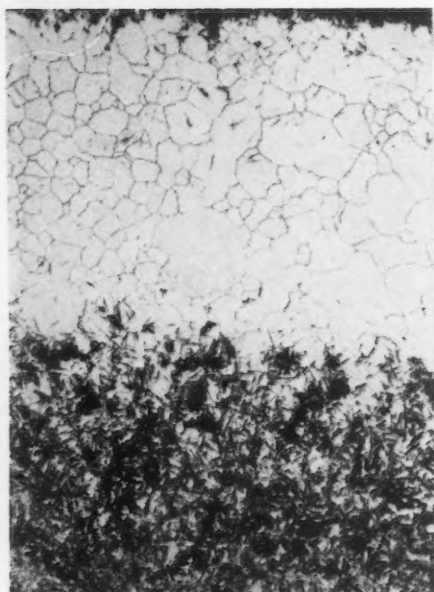
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ter Cable lathe when machined dry with a single point tool.

#### Gear Cutting Tests

From the lathe all four lots of pinions were ground for locating purposes and then machined on the Gleason gear cutter. The first gear cutting operation is the gashing of the teeth. This is followed by the finish gear cutting in the same machine. Lots A and B produced a torn and rough surface on the gear teeth. They caused no appreciable tool wear, but were too soft and had too much free ferrite for finish gear cutting. The shaving action of the Gleason cutters threw a large burr at the bottom of each tooth. Lot D, the oil quenched and tempered blanks, produced an almost perfect surface finish but caused



**FIG. 6**—Unhardened carburized case structure of SAE 3312 steel. A—White layer of martensitic austenite obtained due to rapid air cooling. The dark area is the hard martensitic troosite structure produced through the decomposition of the austenite, at 150 diameters. B—The structure of the area between the white and black zones at A is shown at higher magnification. Note the magnitude of the free martensitic needles and also the degree of disintegration of the light colored austenitic grains into martensite, at 500 diameters. C—Free cementite (white) at the grain boundaries of the disintegrating austenite can be seen very readily in the structure at outer surface of gear hub spline. The acicular martensitic needles within the austenite are also quite perceptible, at 500 diameters. All etched in three per cent nital.

the tools to wear excessively. The constant regrinding of the cutting tools, approximately every 10 gear blanks, made this type of structure undesirable from a production standpoint. Lot C, the lime cooled blanks, showed about the same excellent surface finish as the oil

quenched and tempered blanks, but, in addition, showed no appreciable wear on the cutters.

From the above we learn that a normalized-annealed structure of 179-197 Brinell hardness produces the best machining rate in the automatics. Therefore, the SAE 2515

steel bars should be purchased with these specifications. The cut-off gear blanks from the automatics then should be annealed and lime cooled to produce the best surface finish and longest tool life in the gear cutters.

#### Danger of Soft Skin

Pinions made from SAE 2515 steel harden after carburizing at a much lower temperature than other steels, with subsequent minimum distortion and scaling. However, due to the high nickel content, there is danger of obtaining a soft skin on the bearing faces of the teeth, especially if the carbon in the case is much above 1.0 per cent. This soft skin is due to retained austenite and will show a lower hardness to as great a depth as 0.020 in. Fig. 3 shows, at 50 diameters magnification, an etched cross-section of such a tooth. Note the white layer of austenite at the outer surfaces of the tooth. The area below the white layer is the hard martensite which is desired also in the outer fibers. Fig. 4 shows at higher magnifications (300 and 750 diameters) the character of this white austenitic layer at the outer faces of the tooth and of the martensitic needles below the soft austenitic skin.

This soft skin can be eliminated

**TABLE I**  
Core Properties of Carburized and Hardened SAE 2515 Steel

Rockwell C	Brinell Hardness	Tensile Strength, Lb. per Sq. In.	Yield Strength, Lb. per Sq. In.	Reduction of Area, Per Cent	Elongation in 2 In., Per Cent
40	375	210,000	190,000	58.5	16
38	363	241,000	232,000	54	17
37	352	176,000	140,000	63	20
33	311	170,000	135,000	60	19
32	302	154,000	127,500	69	24
30	285	145,000	110,000	65	22
23	241	127,000	107,000	70	27
22	235	115,000	107,000	72	30
21	229	110,000	95,000	72	33

**TABLE II**  
Core Properties of Carburized and Hardened SAE 3312 Steel

Rockwell C	Brinell Hardness	Tensile Strength, Lb. per Sq. In.	Yield Strength, Lb. per Sq. In.	Reduction of Area, Per Cent	Elongation in 2 In., Per Cent
42	401	215,000	179,000	51	13
41	388	210,000	175,000	57	14
38	363	190,000	160,000	62	16
34	321	162,000	135,000	65	20
29	277	130,000	105,000	68	25
20	223	108,000	88,000	73	27



after hardening by packing in dry ice for 10 days or by submerging in liquid air for several days. This low temperature treatment tends to break down the austenite into the harder martensitic structure. Re-tempering for 10 hr. at 300 deg. F. also has the tendency to break down this austenite.

### SAE 3312 Internal Spline Gear

In producing these internal spline gears for aircraft reduction gear boxes, a lot of  $3\frac{1}{8}$  in. diameter, cold drawn normalized and annealed SAE 3312 steel bar stock, checking 170 to 192 Brinell hardness, was used. The chemical analysis for this material showed 0.15 per cent carbon, 0.36 manganese, 0.024 phosphorous, 0.014 sulphur, 1.55 chromium and 3.44 nickel. This steel showed the banded structure as shown at A in Fig. 5, which is typical of SAE 3312 steel.

For best results from a production standpoint, the manufacturing operations laid out for these gears are rough machine, carburize, finish machine and harden. Due to exceptionally close tolerances (less than plus or minus 0.001 in.) it is impossible to finish machine these gears prior to carburizing since the great length of time at temperature, necessitated by the heavy case of 0.035 to 0.040 in., will cause the parts to distort beyond the allowable limits.

The first machining operations are in the Cleveland automatics where all the roughing operations are performed. Here again, a standard sulphur base cutting oil is used with 5 per cent cobalt high speed steel cutting tools. Although the banded structure is undesirable, it is not so serious in the preliminary roughing operations. The equiaxed ferrite and pearlite grains, due to the normalizing and annealing heat treatment, produces the maximum machining rate in the automatics.

In subsequent operations the external gears are rough cut and finish cut on the Fellows gear shaper with a finish grind after carburizing and hardening; while the internal splines are rough cut on the Fellows gear shaper before carburizing, then finish cut on the Fellows and hardened.

The banded structure gave particularly poor results in the rough machining operation on the gear shaper. Some of the tears produced by cutting along the planes of free ferrite (carbonless iron)

TABLE III  
Composition of Non-Nickel Substitute Carburizing Alloy Steels

Element	C	Mn	Cr	V
SAE 6115	0.10 to 0.20	0.30 to 0.60	0.80 to 1.10	0.15 min.
SAE 6120	0.15 to 0.25	0.30 to 0.60	0.80 to 1.10	0.15 min.
SAE 5120	0.15 to 0.25	0.30 to 0.60	0.60 to 0.90	.....

TABLE IV  
Relative Core Properties of Steels Listed in Table III

Treatment	Single Quench			Double Quench		
	Yield Point, Lb. per Sq. In.	Reduction of Area, Per Cent	Brinell Hardness	Yield Point, Lb. per Sq. In.	Reduction of Area, Per Cent	Brinell Hardness
6115	105,000	49	241	70,000	37	207
6120	112,000	52	302	80,000	45	241
5120	100,000	48	277	.....	..	...

were so deep that finish machining would not remove the rough surfaces. Several combinations of cutting oils, speeds, feeds and depths of cut were attempted in an effort to overcome this condition, but with no success. Several different heat treatments were tried in order to change the structure sufficiently to produce better surface finish with the standard set-up. These heat treatments were necessarily performed before the carburizing treatment since it was the rough gear cutting operations that were to be improved.

The heat treatment finally adopted was a combination renormalize and anneal. The gear blanks were packed in boxes to prevent excess oxidation, scaling and pitting, heated to 1700 deg. F., soaked at that temperature, removed from the furnace and air cooled to 600

deg. F. while remaining in the boxes; reheated in the furnace to 1600 deg. F., held at 1600 deg. F. for 1 hr., cooled in the furnace to 1000 deg. F., and then placed on the floor and cooled to about 400 deg. F.

The pots were then dumped and the gears were allowed to cool to room temperature. This treatment broke up the banded structure to a certain extent and also refined the grain with subsequent great improvement in the machinability rating and surface finish.

### Trouble in Cutting Splines

More serious trouble was encountered on the finish machining of the long internal splines after carburizing. A partial lead to the solution of this problem was found in the hand screw machine operation of facing after carburizing of another gear made from the same

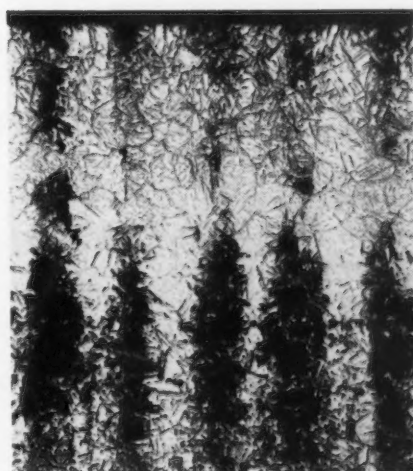


FIG. 7—Unhardened carburized case structure of SAE 3312 steel in other phases, at 200 diameters. A—The banded structure of the original steel is still retained in the case after carburizing. Note how the acicular martensite dominates. B—At higher magnification, it is easy to see how the acicular martensitic needles follow the octahedron crystal planes. At 500 diameters. Both etched in three per cent nital.

steel. The glazed surface of this gear and the excessive wear on the tool indicated extremely high hardness. Rockwell tests made on several of the gears showed a hardness around 55 Rockwell C. Micro-examination showed a martensitic structure in the outer fibers, indicating a too rapid cooling rate from the carburizing heat. The high alloy and high carbon content in the outer fibers gave this steel air hardening properties with resulting high hardness.

To soften these gears sufficiently for the finish machining operations, they were annealed at 1550 deg. F. and slowly cooled for 40 hr. in the furnace. A micro-examination of one of these slowly cooled gears showed that the very slow cooling from the annealing temperature had partially spheroidized the structure in the carburized case, Fig. 5B, and had rendered the material unsatisfactory for gear cutting or broaching. Some of these parts were tried on the Fellows shaper, but they gave unsatisfactory surface finish although the tool life was good. Past experience has shown that gears or splines cannot be cut or shaped satisfactorily when the steel is in a spheroidized condition.

All the gears were then given a short-time box annealing treatment to change the structure from the spheroidized to the lamellar pearlite grains with the excess cementite (iron carbides) at the grain boundaries. This structure resulted in best surface finish and the longest

tool life. It is shown at C in Fig. 5.

The photomicrographs shown in Figs. 6 and 7 also illustrate the points cited above.

#### Non-Nickel Carburizing Steels

SAE 2515 and SAE 3312 are about the toughest and most difficult of all the carburizing steels used for gears and pinions. The high alloy content decreases the machinability rating of these two steels over the lower alloy carburizing steels and in addition introduces unexpected machining and heat treating problems as we illustrated above.

Now with a threatened shortage of nickel in the national defense program, there is a desire to obtain substitute alloy carburizing steels which are readily machinable and equally as good in physical properties as the nickel steels. There are only three fields to enter, namely, the vanadium steels, the chromium steels and the molybdenum steels or combinations of these steels. These steels do not have the core properties of the high alloy nickel carburizing steels, but are equal in strength to the low alloy nickel carburizing steels. Some of the substitute steels are classed as chrome-vanadium steel SAE 6115, chrome-vanadium steel SAE 6120, and chrome steel SAE 5120. The chemical composition and relative core properties of these steels are given in Tables III and IV.

Manganese-molybdenum low carbon steels occupy a prominent posi-

tion in the low priced alloy steel class. The addition of molybdenum, which practically eliminates any tendency toward temper brittleness, and stabilizes the physical properties, largely corrects certain disadvantages sometimes associated with manganese steels. These steels respond readily to heat treatment, have good depth hardening characteristics and good machinability. They can be used where resistance to high impact and fatigue stresses is essential. This steel will show an average analysis of 0.15 per cent carbon, 1.2 manganese, 0.3 silicon, and 0.35 molybdenum.

Chrome molybdenum steels of the 4100 series make good carburizing gear steels. When carburized at 1680 deg. F., cooled in box, reheated to 1525 deg. F., quenched in oil and tempered at 300 deg. F., they show core properties of about 130,000 lb. tensile strength, 100,000 lb. yield point, 15 per cent elongation, 35 per cent reduction in area and 12 ft.-lb. Izod impact strength.

Straight carbon - molybdenum steels of Chrysler's Amola type show good core properties after carburizing and hardening. One grade analyzing 0.15 to 0.25 per cent carbon, 0.70 to 0.90 manganese, 0.20 to 0.30 silicon and 0.15 to 0.25 molybdenum produces when normalized and quenched in oil at 325 deg. F. for 1 hr. the following average properties: 170,000 tensile strength, 120,000 yield strength, 12.7 per cent elongation, 34.4 per cent reduction of area and 311 Brinell hardness.

## White Spots (Fish Eyes) Investigated

RECENT studies of broken test pieces of metal have been made to trace the cause of certain *white spots* or *fish eyes* observed on fracture faces. H. O'Neill, in the April 25, 1941, issue of *Metalurgist*, considers some observations on rails which have broken transversely during service and revealed a large bright patch within which was a granular silvery spot or a dark oxidized spot. From his own studies and a review of the studies of other investigators, O'Neill summarized the types of fracture and their probable cause in the accompanying table:

NATURE OF FRACTURE:	TYPE OF DEFORMATION:	REPUTED PRIME CAUSE:
Hair-line cracks	Static tensile or bending	Hydrogen
Fish eyes in weld metal	Static tensile or bending	Inclusions and/or hydrogen
White spots in car tires	Static tensile or bending	Inclusions (hydrogen not determined)
White spots in castings	Static tensile or bending	Hydrogen
White spots in weld metal	Fatigue	Inclusions or weld crack
White spots in case-hardened or nitrided steel	Fatigue	Combination of stresses producing local peak below surface
Transverse fissures in rails: (a) with silvery spot (b) with oxidized spot	Fatigue	Shatter cracks (due to hydrogen) Inclusions or combined stress peak



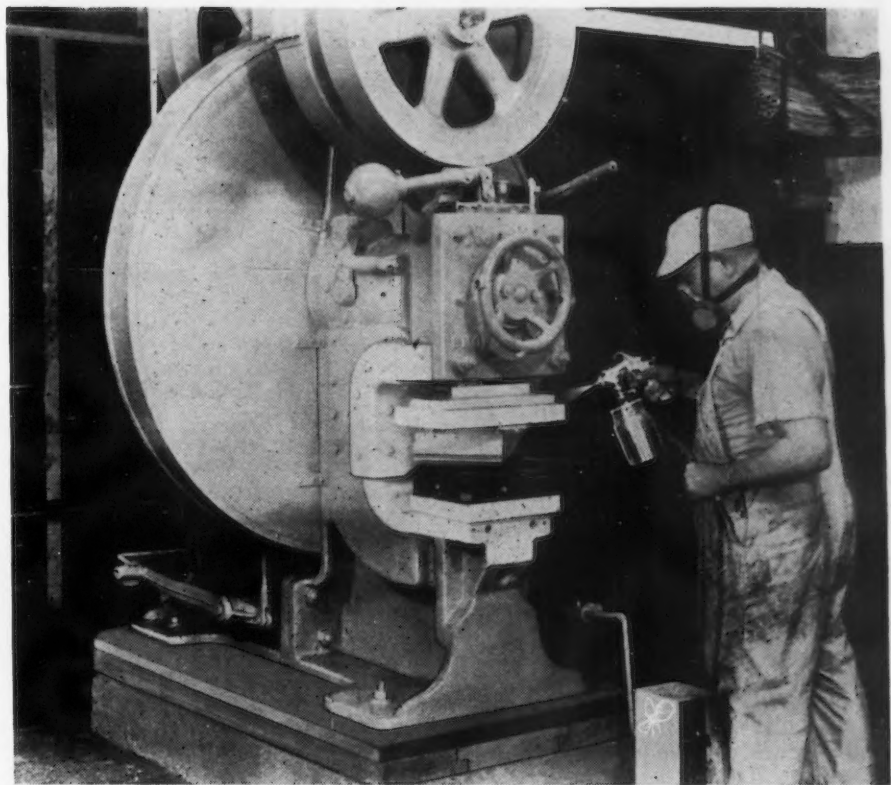
## Machine Tools Made Safer by Color Contrasts

EXPERIMENTS carried out over a two year period indicate that brightness and contrast of paint colors when properly combined on machine tools increase the accuracy of seeing, thus reducing accident hazards, provide more comfortable working conditions and also increase production. The most significant fact developed by these studies is the three-dimensional effect secured by controlled color contrasts. The work piece in machines so treated stands out in stereoscopic clearness that cannot be achieved with brightness contrasts alone.

Results of such experiments carried out in the machine shop of the Philadelphia Electric Co. were presented in a paper before the Illuminating Engineering Society at Atlanta on Sept. 25 by Arthur A. Brainerd of the Philadelphia utility and Matt Denning of the finishes division of Du Pont.

Many colors possessing higher light-reflecting factors than the conventional dark green or battleship gray of machine tools were tested under actual plant conditions, it was explained. Aluminum, light gray, light green, light blue, yellow, and light buff coats were applied in turn to a punch press and a power shear over periods of two weeks. Photometric readings were recorded of light falling on and reflected from working surfaces while time studies were made of production rates. Separate records were kept of the research under both incandescent and mercury lighting. The psychological effect upon the operators, consisting of 15 men, including two foremen, was determined by a simple questionnaire. Results of the brightness measurements, the time studies and the questionnaire were correlated, as shown in the table. The questionnaire was rated on the percentage of "yes" and "no" answers to six questions, such as, "Is paint more or less tiring than the original?"

A study of the table and other



**A**FTER painting this punch press to remove the camouflage caused by solid, drab colors, the working area was "spotlighted" with a light buff paint. This reduced eye fatigue and increased operating efficiency because the work in production stood out in stereoscopic sharpness.

data would seem to indicate that light buff is the most suitable color where the material under fabrication is iron or steel (as it was in the tests), with light gray a close second. The main criticism of the light buff was that it was an impractical color from the maintenance angle. Accordingly as a compromise, the paper points out, all machines were painted a medium gray with light buff around the working area. Surprisingly, the combination seemed to perform better than any of the solid colors. The

above color arrangement has been in use since September, 1939. Mechanics soon become so convinced of the benefits of this color scheme that they keep the light area clean without immediate supervision.

In general, it may be stated that soft contrasts are easier on the eyes than abrupt changes in brightness; that making the tool area slightly lighter does tend to concentrate attention on the work, and that bright contrasts can be used to highlight danger points.

COMPOSITE RATINGS OF COLORS ON MACHINES

Color of Paint	Per Cent Rating, Mercury Light					Per Cent Rating, Incandescent Light				
	Time Study	Re-flected Light	Ques-tion-naire	Aver-age	Final Rating	Time Study	Re-flected Light	Ques-tion-naire	Aver-age	Final Rating
PUNCH PRESS										
Yellow		92.3	8.7	50.5	51.1		64.6	10.7	37.7	37.7
Light blue		79.3	31.2	55.3	56.0		88.0	61.6	74.8	74.8
Light buff		97.5	100.0	98.8	100.0		100.0	100.0	100.0	100.0
Medium gray and light gray		100.0	43.7	71.9	72.6		93.7	53.9	73.8	73.8
SHEAR										
Light buff	100.0	100.0	100.0	100.0	100.0	100.0	92.9	100.0	97.6	100.0
Aluminum	67.1	88.4	100.0	85.2	85.2	69.1	78.6	100.0	82.6	84.6
Light green	95.5	64.8	18.2	59.5	59.5	85.5	77.7	19.6	60.9	62.4
Light gray	97.2	87.5	54.0	79.6	79.6	82.8	96.5	97.6	92.3	95.6
Dark green and light gray	88.5	91.1	18.5	66.0	66.0	75.8	100.0	23.3	66.4	68.0

The per cent ratings for time study, reflected light and for the questionnaire are averaged for each color as shown in the average column. The color having the highest average rating is then assigned a final rating for 100 per cent, the other colors in each group being rated as percentages of this value. Time study ratings are inversely as the time to perform the job, that is 100 equals shortest time of group.

# Qualities of Gray Cast

**G**RAY cast iron, produced in many grades or qualities to satisfy the requirements of a great variety of applications, is used more extensively than any other cast metal. It may be cast with ease into intricate shapes and thin sections, it has a wide range of mechanical properties, it has favorable machining characteristics, and it is low in cost. Indicative of its wide application, it is used for cylinder blocks for internal combustion engines, stoves and furnaces, machine-tool bases, car wheels, pipe and enameled ware, even though the requirements imposed are obviously quite different.

*One recent case is known where a foundry accepted a large contract for iron castings to be furnished on A.S.T.M. specifications, of a quality to give a minimum tensile strength of 35,000 lb. per sq. in. The foundry had been using test bars cast 1.20 in. in diameter, and all data had been collected on this basis. However, the inspector insisted on using a 2-in. test bar because the castings had some sections greater than 2 in. in thickness. As a result of this misunderstanding, a type of iron was required for the contract which cost much more than was estimated by the foundry.—Ed.*

As a rule, the quality of cast iron is based on the tensile strength of the metal when cast in bars of a definite size and turned to specimens having definite dimensions. However, other characteristics such as resistance to heat or corrosion, the flowability of the metal, the anti-friction property, and the ability to harden deeply on chilling may influence the selection of cast iron for specific uses. The chief factors that influence the properties of cast iron in the condition as cast are chemical composition and the rate of cooling from the molten state. Many different compositions of cast iron are utilized to obtain the desired chemical and physical properties. The proportions of total carbon, silicon, manganese, sulphur and phosphorus, as well as the special alloying elements, including nickel, chromium, molybdenum, vanadium and titanium have an effect on the resulting properties.

By H. L. CAMPBELL

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One of the most significant characteristics of gray cast iron is shown in the changes in properties resulting from different rates of cooling. When this metal cools from the molten state and solidifies, carbon separates in the form of graphite, thus breaking up the continuity of the metallic matrix. The slower the cooling, the larger the amount of graphite formed in the metal. The proportion and condition of the graphite which separates during cooling affects the properties of cast iron to a considerable extent. As a rule the strength of the metal will be lower in heavy sections which cool slowly in the mold than in light sections which cool rapidly.

The standard specifications of the American Society for Testing Materials for gray iron castings, Designation A-48-36, provide for seven grades or qualities known as Classes 20, 25, 30, 35, 40, 50, 60, these numbers corresponding to minimum tensile strengths. Thus, class 20 refers to a quality of gray cast iron having a minimum tensile strength of 20,000 lb. per sq. in., and the remaining classes increase in steps of 5000 lb. up to 40,000 lb. per sq. in., then in steps of 10,000 lb. to 60,000 lb. per sq. in. Three sizes of separately cast test bars are recommended, each of which corresponds to the controlling dimensions of the casting which it represents. Test bar A, cast 0.875 in. in diameter and machined to 0.505 in. in diameter is intended to represent castings 0.50 in. and under in thickness; test bar B, cast 1.20 in. in diameter and machined to 0.80 in. in diameter is intended to represent castings 0.51 to 1.00 in. thick, and test bar C, cast 2.00

in. in diameter and machined to 1.25 in. is intended to represent castings 1.01 to 2.00 in. in thickness. For sections over 2 in. in diameter, larger test bars may be used by agreement between the manufacturer and purchaser. The object of the different sizes of test bars is to approach the cooling rates of the castings which they represent.

In the A.S.T.M. specifications, designation A-48-36, a provision is made for the manufacturer and purchaser to agree upon the controlling section for a given design of casting, and therefore upon the size of test bars corresponding to the controlling section. This decision should be made only after considering the differences in the sections and the properties actually required in each section. When the strength of the metal in the light sections is most important, standard test bars which will have approximately the same cooling rate as the metal in this section should be adopted. On the other hand, when the properties of the metal in the heavy sections are most critical, test bars corresponding to these sections should be selected. In castings having light and heavy sections, there is a possibility of the light sections being unmachinable if high strengths are demanded in the heavy portions. Special attention should be given to avoid this condition.

Definite information as to the quality of the iron specified on any contract must be established before accurate costs can be determined. If alloys are required or special molding methods are necessary to obtain the desired results, these factors should be taken into account in arriving at the costs. Another item of expense which should not be overlooked is the cost of preparing and testing specimens of the iron as required in the specifications.

Although the standard specifications for gray iron castings include



# Iron

IN this article, the author points out that a rationalization of testing methods and a correct solution of test bar sizes will not only eliminate misunderstandings between foundries and purchasers of gray cast iron for government work, but will effect a great saving of time and money for the manufacturers.

classes having high tensile strengths, it is not economical to specify a class of iron of higher strength than is actually needed for the work. As the quality of the iron is raised, more care is required in producing good castings. Furthermore, special alloys are necessary in the commercial production of the higher strength irons. Another item of expense is the cost of machining which is usually higher as the tensile strength increases.

In many designs of iron castings, the metal is subjected to loads in

compression. As the strength of gray iron in compression is equivalent to three and one-half to four times its strength in tension, relatively high stresses can be resisted without using the superior grades of iron. However, the selection of a satisfactory quality of cast iron for a given purpose must be based on all the requirements of the specific design.

## Effects of Size of Test Bars

The effect of the size of separately cast round bars of cast iron

on the tensile strengths of specimens turned from these bars is shown in Fig. 1. Each curve on the chart records the average tensile strengths of a given type or quality of cast iron which has been cast in bars of different sizes. The three standard sizes of test bars recommended in the A.S.T.M. specifications are indicated by vertical lines on the chart. When the strength of a given iron has been found for one size of test bar, the average strengths of the same iron cast in bars of other sizes can be found on

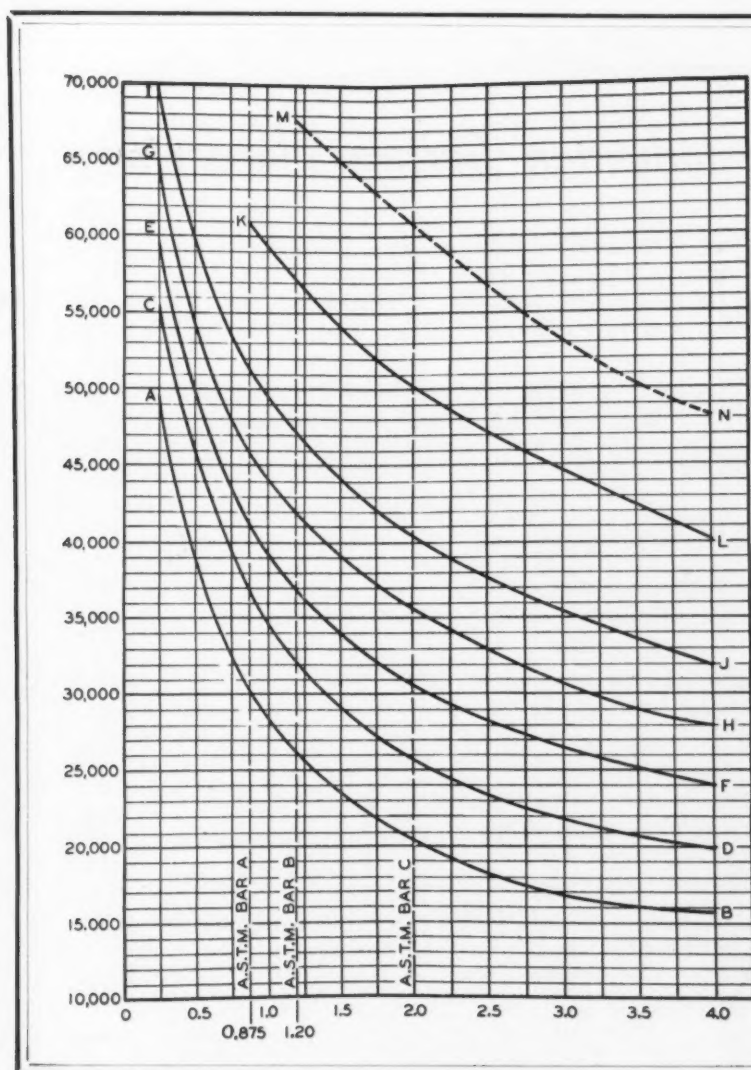
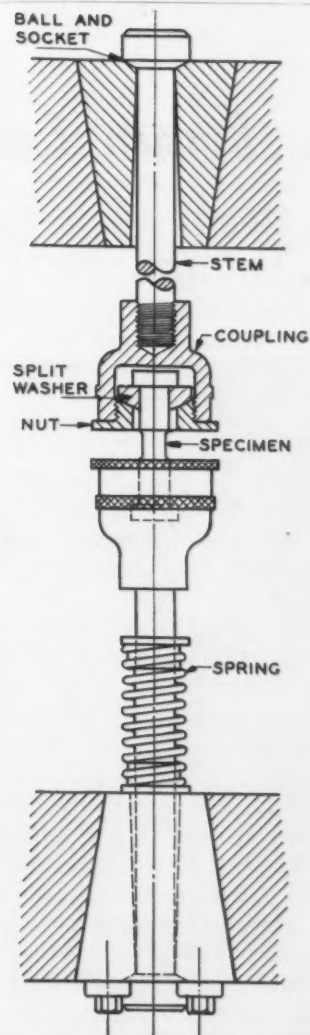


FIG. 1—Shown here is the effect of the size of separately cast round bars on the tensile strengths of test specimens turned from these bars.

RIGHT

FIG. 2—For testing gray cast iron specimens a holder that insures that applied forces are axial with the specimen must be used. The ball and socket joint arrangement at the end of each stem and between the split washer and the nut within each of the couplings of this holder permits complete flexibility in the alignment of loads.



the chart. An iron which will meet the requirements of A.S.T.M. Class 20-C will be approximately equivalent to an iron satisfactory for A.S.T.M. Class 30-A. A different composition of cast iron would be required to obtain 40,000 lb. per sq. in. in A.S.T.M. bar C than would be needed for A.S.T.M. bar B. The strengths of any iron cast in separate bars of different sizes can be found by drawing lines parallel to those in Fig. 1. The curves on the chart are the approximate boundaries of the seven classes of gray cast iron listed in the A.S.T.M. specifications. For example, the area between curves AB and CD prescribes the range of tensile strengths of all A.S.T.M. Class 20-C irons.

The curves in Fig. 1 are based on experimental data obtained from separately cast round bars of gray cast iron of different qualities. In castings having light and heavy sections, the changes in properties in different sections will not correspond exactly with the differences shown in Fig. 1. The reason for this condition is that the heat in

the heavier portions of the castings will retard the cooling of the metal in the light sections, and thus cause the properties in the light sections to be lower than those found in separately cast bars of the same metal.

The tensile strengths indicated by curve EF in Fig. 1 show that an iron which will have 30,000 lb. per sq. in. in A.S.T.M. bar C will have a strength of 60,000 lb. per sq. in. in a round specimen  $\frac{1}{4}$  in. in diameter. Other comparisons may be taken from the chart. It should be clear that *the quality of gray cast iron is not indicated when the tensile strength is stated without reference to the size of the cast specimen used for the test.* Much published information on the strengths of specific irons is misleading because the sizes of the test bars from which the results were obtained have not been stated.

#### HOLDERS for Test Bars

In making tensile tests of gray cast iron, it is very important that the loads on the specimens be ap-

plied only in tension, as any forces in transverse directions will lower the breaking loads. The V-grips as ordinarily supplied with testing machines are not satisfactory for testing specimens of gray cast iron, because cast iron is not ductile enough to allow the metal to deform sufficiently to line up with the loads. To insure that the applied forces are axial with the specimen, holders must be used which will permit complete flexibility in the alignment of the loads. The design of holders shown in Fig. 2 has a ball and socket joint near the end of each stem, and another ball and socket joint between the split washer and the nut within each of the couplings. With this arrangement, accurate results can be obtained in tension tests. The shouldered ends on the test specimen as illustrated in Fig. 2 are preferred because less time is required in machining these specimens than would be necessary if specimens with threaded ends were used. The spring around the lower stem is provided to take the shock when the specimen breaks.

## Russian Experiments in Induction Surface Hardening

AS described by A. D. Assonov in *Vestnik Metallopromyshlennosti*, 1940, No. 3, in Russian, the high frequency induction surface hardening method developed by Prof. V. P. Vologdin has been successfully applied to hardening crankshafts for both gasoline and diesel engines. Contrary to the equipment developed by the Ohio Crankshaft Co., Cleveland, and that designed by the Allgemeine Elektrizitäts-Gesellschaft, the equipment used in the Stalin Automobile Works eliminates all movement of the crankshaft between the treatment of each neck.

Thirteen inductors are built into one machine, each inductor consisting of two halves, to permit insertion of the crankshaft. The inductors are controlled automatically and the total time of treatment is  $2\frac{1}{2}$  min. The conditions of treatment are such that no subsequent tempering is necessary before final machining, and the surface hardening process is incorporated in the machine tool line.

The grain size of the shaft should be relatively fine. A surface hardness of 60 to 65 Rockwell C is obtained, the grain structure near the surface being that of very fine, uniformly distributed martensite. The depth of hardening is 0.157 in. In the article, the author refers to such aspects of the process as overheating, quenching cracks and the effect of time of quenching on the hardness. Fatigue tests and service wear tests have demonstrated excellent properties and behavior of the surface hardened crankshafts.

V. P. Vologdin and V. N. Romanov claim priority for the invention of the electrical induction method of surface hardening, with Russian patent claims that date back to 1935. The method has since been extensively developed, both on the theoretical and practical sides at Professor Vologdin's laboratory at Leningrad Electrotechnical Institute. Temperature distribution in the metal and operating conditions have been fully worked out and graphs have been obtained correlat-

ing frequency and depth of quenched layer.

Inductors for commercial use have been developed for both round and flat parts. The efficiency of inductors for the flats has been increased considerably by the use of an iron magnetic circuit. A water-cooled iron magnetic circuit is also used in the transformer.

In a discussion by M. G. Lozinsky various possibilities of applying high frequency induction heating to the surface hardening of steel. Theoretical aspects of the process are considered, with special reference to the relation between depth of hardening and frequency and to the process of heating up, which may or may not depend on the conduction of heat into the interior of the metal. Overheating at the surface, time of treatment and power consumption are also considered, as well as the design and arrangement of the essential parts, the inductor and quenching sprayer, for hardening flat surfaces and the external and internal cylindrical surfaces.



# 2,000,000 Crankshafts Without a Reject

**M**ORE than 2,000,000 crankshafts have been hardened without a rejection for incorrect hardness by a 2000 cycle inductive heating installation at the Chicago tractor plant of the International Harvester Co. Heating time for hardening has been cut from 12 hr. to less than 5 min. by this installation, which is used to harden five different sizes and types of shafts for diesel and gasoline engines and which simplifies balancing, eliminates normal pickling processes, and increases core toughness.

Formerly, drop-forged shafts were normalized, hardened and drawn, pickled or shot-blasted to remove scale, then machined and ground. The physical properties of the main bearings were limited because of the machining operations that followed hardening, and carburizing these shafts was not a practical means of increasing their hardness because of distortion. Final hardness ran between 25 and 30 Rockwell C.

The shafts are now normalized, completely machined except for the final finish, then heat treated by an

inductively heated collar fitted around the wearing surfaces only to a hardness of from 55 to 62 Rockwell C, drawn at 350 deg. F., and ground. Pickling is no longer necessary as inductive heating introduces no scale.

Using conventional hardening methods, shafts were made of a nickel alloy steel of the 3100 series, which has been made currently unavailable by defense restrictions. With inductive heating methods of hardening, the more costly nickel steel has been replaced by cheaper and more readily available carbon-chrome steel.

The shafts are balanced on a Dynetric balancing machine at the rate of from 12 to 15 per hr., depending on size. Drilling for balancing is controlled automatically, and is simplified as a result of inductive hardening because distortion in heating is almost negligible, resulting in less material to be removed from crank throws.

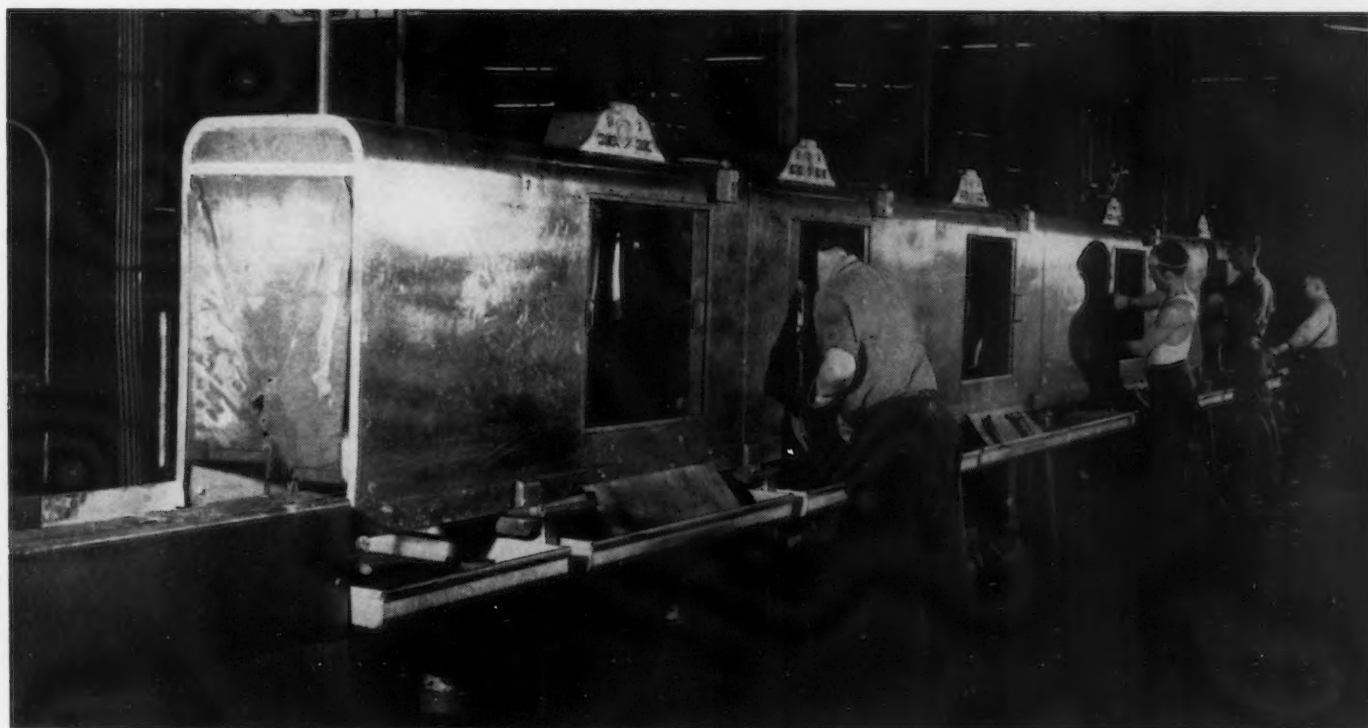
Main bearings and connecting rod pins are hardened singly in six upright stands in a nine-station tunnel line. Heating cycle is only  $4\frac{1}{2}$  sec. for main bearings and 4

sec. for connecting rod bearings, followed by a water quench. Length of the heating cycle is automatically controlled by a timer driven by a synchronous motor. Power fed to the heating stand by the generator is increased automatically by the timer as the heated metal reaches the non-magnetic state and heating effect decreases.

This method of hardening the crankshaft is said to produce a better final finish because of increased hardness, and breakage of shafts in service has been reduced materially by the greater toughness of the shaft core. Total rejections for metallurgical defects have been reduced to an average of less than 1 per cent, and production at the present time is upwards of 4200 crankshafts a week.

This inductively heated hardening installation was the first installation licensed by the Ohio Crankshaft Co., Cleveland, and power for the tunnel line and two of the upright stands is supplied by a Westinghouse 300 kw., 2000 cycle generator. The other four upright stands are supplied by a similar generator rated at 250 kw.

International Harvester Co. uses inductive heating for other tractor parts, including track rollers and track link pins. Two separate upright heating stands are used for the rollers and another is used for the pins, power being supplied by a 300 kw. Westinghouse generator.



# Soft Soldering—Tools and Technique

AS ordinarily defined, soldering is the process of joining by partial fusion and the insertion of a metallic alloy or solder, the surfaces of similar or dissimilar metals. The strength of such joints depends upon the nature of the solder used and the temperature at which the joining was completed. In a study of soft soldering, A. J. T. Eyles reported in *Sheet Metal Industries* some precautions that may be heeded to produce better soldered joints and made some suggestions on various types of soldering tool furnaces, soldering tools, practice and the composition of soft solders and fluxes used in the sheet metal industry.

The condition, life and performance of soldering tools are of prime importance to the sheet metal craftsman, and they must be safeguarded against overheating, oxidation, burnt "tinning," and rough handling. Any type of furnace or fire may be used to heat soldering tools, but it is better to avoid the type of furnace or fire that employs bituminous coal, with its accompanying dirt, smoke and tarry substances. Electric, gas, charcoal, and coke fires are recommended for such heating, but the electric and gas heated units effect an economy by reducing the number of retinnings necessary for the tools.

Modern electric furnaces are fitted with special tipping devices and cut-outs, whereby the current is kept at the minimum, being automatically controlled in accordance with the number of tools under heat. With the switch on, the muffle is kept warm, and the insertion of one or more soldering tools turns on the requisite energy to give rapid heat. Fig. 1 shows an electric furnace recently designed to accommodate two 1½ lb. soldering tools. It is fitted with an inner nickel-chromium heat resisting metal chamber to withstand continuous wear, and has a nominal rating of one kw. Such equipment has the advantages of no fumes in the workshop, rapid and uniform heating, the elimination of pitting

the tools due to gas fumes, and safety in operation.

Modern low-pressure gas fired soldering furnaces are very economical for heating copper bits where work is continuous. Experience, however, has shown that these furnaces should be cleaned out regularly as the secondary air ports become restricted, causing a reducing atmosphere in the furnace which has a bad effect on the copper tool, resulting in cracking off the tip because of the extraction of oxygen.

In modern gas furnaces, for speedy soldering operation, the heat is obtained by radiation of the surrounding fire brick chamber and not by direct contact. This results in clean soldering tools and avoids burning. Advantages are also obtained in these furnaces owing to the non-blocking of the burners by molten solder and fallen dross, fire bricks are not clayed into position, and have due provisions for expansion and contraction by specially molded fire bricks.

Soldering tools are made in different sizes and shapes. Small tools should never be used on heavy or large size jobs, as they do not contain sufficient heat to allow the solder to flow freely into the seams and joints. The heat from these tools is quickly conducted from it and the tool cools quickly, with the

result that the solder chills and renders the work ineffective.

Soldering tools can be forged to any desired shape by placing a copper bar in a clean bright fire and heating it to a cherry red color, about 1300 deg. F. Tools forged from electrolytic or best selected copper drawn bars are better heat retainers than such tools cast from ingots, the tips of the latter being more liable to crack when forged. Scale formed during the heating process should be removed by filing and the form forged on an anvil or suitable iron block by hammering. The shank of the finished tool should not be too long, as this is likely to tire the user. For general work, the tool should be about 15 in. long from end to end.

Before a soldering tool can be used effectively, it must be tinned, that is, the points or slopes must be coated with a tin-lead alloy. When tinning pointed or ordinary tools, the tool must be heated to a dull red and filed bright on four sides not higher than 1 in. from the point. When the copper is sufficiently hot, the filed areas should be rubbed briskly with a block of salammoniac in a cavity in the center of which is melted a small portion of solder. Another tinning method is to dip the heated tool, after filing, into a solution of ammonium chloride or zinc chloride,

TABLE I  
Composition of Soft Solders with Fluxes for Various Sheet Metals

Sheet Metal to Be Soldered	Flux	Composition of Solder, Per Cent		
		Tin	Lead	Bismuth
Aluminum	stearin	95	..	5
Brass	zinc chloride or resin	67	33	..
Copper	zinc chloride or resin	67	33	..
Galvanized iron	dilute hydrochloric acid	50	50	..
Lead	resin or tallow	33	67	..
Monel	zinc chloride	66	34	..
Nickel	zinc chloride	66	34	..
Pewter	resin, tallow or olive oil	25	25	50
Silver	zinc chloride	70	30	..
Stainless steel	hydrochloric acid and zinc chloride in equal proportions	55	45	..
Terne steel	zinc chloride	50	50	..
Tinned steel	zinc chloride	55	45	..
Zinc	dilute hydrochloric acid or zinc chloride	50	50	..



applying solder to the cleaned areas and again dipping the tool into the liquid to spread the tinning coat evenly. A disadvantage in dipping the soldering tool into zinc chloride, unless a second bath is used, is that the liquid becomes contaminated with dirt and copper salts, making it useless for fluxing new work.

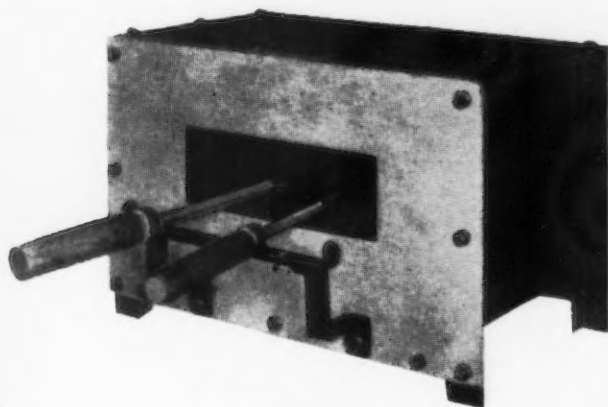
There are several designs of self-heated tools with built-in electric and gas heating units. Figs. 2 and 3 are useful self-heating tools

cious and free flowing in conjunction with a suitable flux. In order that joints may hold securely it is desirable that the soldering medium penetrate into the pores of the metal and form an alloy.

Metal surfaces to be soldered must be chemically clean and free from oxides until alloying or adhesion has occurred. When surfaces are not clean but covered with an oxide film, many inorganic fluxes, active types, clean the sur-

as a cleaner and a flux is quite serviceable, but when materials require considerable cleaning before the soldering process, it is worth while to make cleaning and fluxing separate operations.

Experience proves that money saved through the use of cheap solders is usually lost by increased cost of actual work. Solders should not be purchased indiscriminately without full assurance of their content. In the accompanying table, solder compositions for joining various metals are recommended.



**FIG. 1**—This electric soldering tool furnace will accommodate two 1½-lb. tools and is fitted with an inner nickel-chromium heat chamber.

## Studies on the Emissivity of Liquid Steel

**I**N a theoretical discussion aided by practical experiments, reviewed in *Tetsu to Hagane*, Feb. 25, 1941, in Japanese, T. Sugeno examines the methods of measuring the emissivity of a steel bath and the relation between the values

that are gas heated, eliminating the use of an extra soldering tool that is heated while another is in use. The copper bit in the tool in Fig. 2 is independent from the heater, and may be replaced by any piece of copper forged to any shape required. It can be brought forward to compensate for wear. Shields protect the flames from draughts.

Electric soldering tools are ruggedly designed, but due care must be exercised in handling as they will not withstand the rough usage sometimes given other types. It should be remembered in the use of these tools that they should be kept free from acid fumes as much as possible, and when using acid flux, it is advisable to use only as much as is absolutely required. Electric tools requiring from 50 to 100 watts are suitable for light metal work, and tools requiring from 300 to 400 watts are best suited for heavy section assembly. Oil or paraffin heated tools are extremely useful for outdoor work.

The essential qualities of a good solder are determined by the constituents that enter into its composition. The strength required for joints must be kept in mind in choosing a solder for a given class of work, and in order to perform well, a solder must be hard, tena-

faces enabling them to alloy readily. If the base metal oxidizes slowly at the soldering temperature it is usually sufficient to coat the cleaned surface with tallow or a similar substance. For such soldering, the only requirement of a flux is that it should be present during the actual soldering operation. Almost any liquid substance that does not contain free oxygen and that remains liquid without serious decomposition at the soldering temperature would be suitable. Fluxes of the protective type in addition to tallow are: resin, oleic acid, and other prepared fluxes that are readily obtainable. The use of an acid both

obtained, the degree of refinement of the steel, and the quantity and nature of alloying elements present.

The conclusions reached by Sugeno include: (1) in the open hearth furnace, emissivity is closely related to the quantity of ferrous oxide (FeO) present in the liquid steel; (2) in the electric arc furnace there is only a correlation between emissivity and the ferrous oxide content during the last stage in the reduction; (3) the emissivity of molten plain carbon steels is usually lower than of molten alloy steels; and (4) the emissivity of steel is increased by manganese additions.



**FIG. 2**—This self heating soldering tool uses gas, and protects the flame from draughts by shields. The bit is also adjustable.



**FIG. 3**—Internally gas-heated soldering tools are useful for outdoor work, as are tools heated by electricity, oil, and paraffin.

# Conveyor Line for Aircraft

• • •

**A** MASS production technique new to aircraft manufacture has been introduced in the factories of the Glenn L. Martin Co., Baltimore, in the construction of Martin bombers. A belt-conveyor line carries all of the various machine and hand operations required to make airplane sub-assemblies to men who are doing the assembling.

Early estimates indicate that, on these sub-assemblies, man-hours worked have been reduced by one-half and more spectacular savings will result when the workmen become more accustomed to their respective operations. By this system, the work that one or two men customarily do in making an airplane sub-assembly has been distributed among a number of men, each operating one machine or performing one hand operation.

Two or more men at the head of the belt pace the line. Before them are jigs into which pre-formed or pre-shaped parts are fitted together and the first drilling operations performed, vari-colored patterns indicating instantly the required drill size. The pieces are then placed on the belt and progress through the hands of the drill press man, riveter, burring machine operator and assembly man to the inspector, who checks the work of all operators.

The conveyor system is not limited to a single sub-assembly, but can take any part to be assembled that requires similar operations. Furthermore, two or more sub-assemblies can be run through the line simultaneously by adding another jig at the head of the belt and instructing the operators as to what must be done.

It has been found that the single task operator not only attains greater accuracy, but also higher speed and greater dexterity. Of equal importance is the fact that men of lesser skills can be used on the line, freeing highly skilled workers for more important duties.

RIGHT

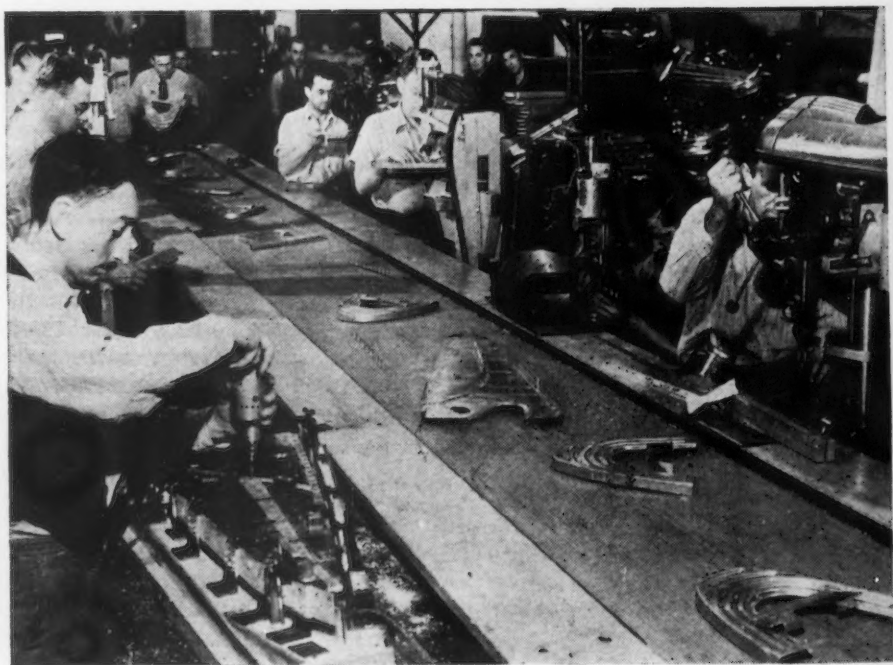
**T**HIS belt conveyor technique, used for the first time in the aircraft industry by the Glenn L. Martin Co., Baltimore, reduces the manufacturing and assembly time on bomber sub-assembly parts by one-half and permits the use of non-skilled and semi-skilled labor, freeing highly skilled workers for more important duties in the airplane factory.

• • •




BELOW

**P**ARTS for the sub-assembly of the Martin bomber at the Glenn L. Martin Co. move along this belt conveyor to various operators who each perform one task. The parts leave the belt completely assembled and ready for inspection.







## Keeping men at work

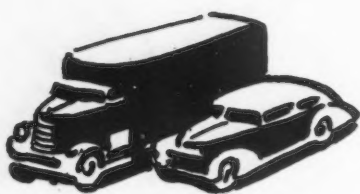
The safety of "A.W." Rolled Steel Floor Plate has real meaning in defense plants. Saves man hours by minimizing costly slipping and falling accidents. Here is the one safe floor for every industrial use. There are no worn and slippery surfaces to endanger men on foot. No cracks or ridges to upset floor trucks. Oil-proof, heat-proof, fire-proof, crack-proof. Easy to clean, quick to drain. Made in five patterns. The Super-Diamond Pattern is shown here. Write for illustrated folder.

## "A.W." *Rolled Steel* FLOOR PLATE

ALAN WOOD STEEL CO., CONSHOHOCKEN, PA.  
District Offices and Representatives — Philadelphia, New York,  
Boston, Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Denver,  
Detroit, Houston, New Orleans, Pittsburgh, Roanoke, Sanford, N.C.,  
St. Paul, St. Louis, Los Angeles, San Francisco, Seattle, Montreal.

# Assembly Line . . .

• **Contract for 1000 cargo airplanes is pending . . . High tribute paid to productivity of Detroit plants by Knox, who also takes jab at defense strikes . . . Packard tooling progresses.**



**D**ETROIT—Last week a plan was brewing hot for a huge fleet of cargo airplanes and we mentioned here that Detroit might play a prominent role in their development and production. This week it appears that a contract for the manufacture of 1000 of these planes is pending. A story elsewhere in this issue tells how Detroit will participate.

*Turn to page 93 of this week's issue for details of the cargo plane program.*

**N**EW materials, new processes, and new plants are the order of the day in Detroit. Biggest project to take its final form during the week was the U. S. Naval ordnance plant which was dedicated Oct. 28 by Navy Secretary Frank Knox. Incidentally, unreported in the daily press is the fact that Knox got so wound up in a radio speech that he over-ran his time without actually dedicating the plant. After the broadcast he came back to the rostrum and made a formal but belated dedication which was photographed by the news reels. Most of the newspaper reporters present in press row had dashed for telephones as Knox concluded the radio broadcast and they missed the little by-play.

What sent newsmen rushing to 'phones was Knox's slashing words about strikes and agitators in defense plants. He told 1000 workers

in this Hudson-operated arsenal and 400 invited guests that strikes in defense plants are as unpatriotic as strikes or slackness in duties aboard a ship at sea, and he urged workers to disregard agitators and "give them the lie in their teeth." While Knox laid down the law, Hudson's president, A. E. Barit, just as properly praised the thousands of Hudson employees who, while still handling their regular jobs, attended school on nights and Sundays in order to study the exacting requirements of gun manufacture and prepare themselves for jobs in this arsenal where some 7000 men eventually will be employed. The defense vocation education program of the Detroit public school system has already trained 3000 machine operators for the arsenal.

**S**OME of Knox's words will be much-mulled over by Detroit, which remembers him as one of the defense leaders who, more than a year ago, were seeking to close Detroit's auto plants, despite the consequences of unemployment and useless waste which auto men could foresee. These same auto men listened last week as the same Cabinet officer paid high tribute to the productivity of Detroit plants. After his first-hand inspection of major defense plants, Knox said at the Hudson plant, "Critics, who have been telling us that we are far behind in our defense program, should spend a day in Detroit to see the tank plant, Pontiac gun plant and this arsenal."

The Navy secretary's speech was inspirational for the most part, but shocked a large part of the audience—and drew little applause—when he said (after mentioning some of the President's "shooting war" speech of Navy Day) "we are in this thing to the finish—thank God for that." If Knox meant exactly what he said, and he certainly put in enough emphasis, he found little agreement in the audience, because there aren't many men who are thankful to God for war.

As to actual progress in the Hudson arsenal, company officials report that the 15 buildings, on 135 acres, are complete, but that tooling is only about 50 per cent complete.

Another defense plant unofficially reports progress on its tooling. Packard's Rolls Royce manufactur-

ing plant is said now to be 80 per cent tooled for volume production, 95 per cent tooled for limited production. Output is running at a rate of less than one engine per day, the grapevine says, but a Packard official indicates that 100 completed engines will have been shipped by the first of the year. The 800-per-month schedule that has been mentioned looks like a 1943 possibility. This is perhaps a reflection of the tough problems that are encountered in putting such a powerplant into production.

**F**ORD is turning out one or more engines a day in the plant devoted to manufacture of the Pratt & Whitney twin-row wasp engine. Exact figures on all of these projects are restricted, of course.

This new Ford plant has the largest air-conditioning system ever installed in an American industrial plant, it is claimed. The system will handle 2,000,000 cu. ft. of air per min., changing the air inside the \$23,000,000 airplane engine building every 10 min. The building has no windows opening into the manufacturing area for natural ventilation, so the air-conditioning meets these needs as well as providing constant temperature and humidity conditions for accuracy and reducing dust.

Last week saw the formal opening also of the new plant operated by Chrysler exclusively for the production of aluminum forgings for medium Martin bombers.

It is not generally known, but this plant represents the efforts of men who flew in the face of advisers who told them "It can't be done" last winter and in the early spring when it became apparent that lack of forging facilities for aluminum alloy might prove a tragic phase of our defense program. The Big Three in the auto industry set out to prove that it was within their ken and ability to make these difficult forgings. They proved it and, as a direct result Chrysler undertook plans for the production of such forgings.

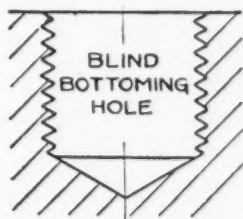
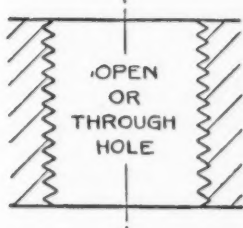
**S**TEEL construction for the new building, which is located adjacent to the Dodge Lynch Road forge plant, started on July 28 of this year; the plant was completed and the first forging made in less



# Hole Hints FOR TAPPERS

**S**LOW production, rejected parts and broken taps, are often due to poor preparation of holes for tapping operations. Here are some points which will help you to prevent costly losses.

Always keep in mind that good clean drilling and a reasonable size maintenance are keys to better, faster tapping and with less strain on the tap and less power consumption.



For open or "through" holes in steel, use "Gun" or Plug Taps; stick to Plug Taps for gray cast iron and non-malleables; for cast iron containing steel, use "Gun" Taps. For blind or bottoming holes, use a Bottoming Tap if the full length of the hole is to be threaded. Always be sure the drill chips are removed from the bottom of the blind hole before you start to tap.

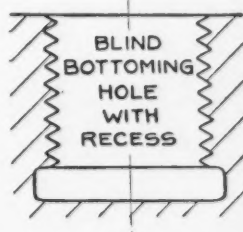
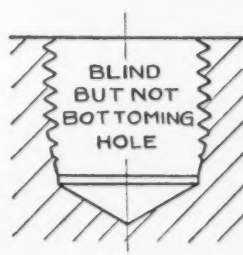
A 100% thread depth requires 3 times the power necessary to tap a 75% thread, but is only 5% stronger. A nut

with 50% thread depth will break its bolt before the thread will strip. Good manufacturing practice should provide a depth of thread not less than 62% to 75% (depending on the size) and not more than  $83\frac{1}{3}\%$  of the basic thread depth. Remember these facts and you will not make your drilled holes too small.

The tougher and harder the material, or the deeper the tapped hole, the smaller the thread depth you can safely adopt.

Punched holes in thin sheet metal tend to cause taps to "load" and break. See that punched holes are not too small. Same with cored or forged holes in casting or forging. It pays to drill them.

As a guide to the most practicable drill size for all threads, consult any standard tap drill chart. We will gladly send you one on request.



*This is one of a series of advertisements published by Greenfield Tap & Die Corporation to help users get greater production from their small tools in these critical times, through making useful facts more widely known*

**GREENFIELD TAP AND DIE CORPORATION • GREENFIELD, MASSACHUSETTS**

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than three months. With 11 steam-hammers and the floor area of 34,000 sq. ft. the plant will produce aluminum alloy forgings for several planes a day, approximately 5000 parts. More than 500 sets of dies are required to produce the forgings which range in weight from one-tenth of a pound to 10 lb. Forgings are heat treated, cleaned and made ready for the machine shop in the new building. After machining they are being sent directly to Martin assembly plants in Akron and Omaha and to the DeSoto-Warren Avenue plant where nose and center fuselage sections for Martin medium bombers are to be made. Some forgings also will be supplied to Hudson, which is making the rear fuselage section for the Martin bomber.

Tying-in with the report of Hudson progress on its arsenal is one from Pontiac about its production of the 20-mm. anti-dive bomber machine gun. This is the same gun as the one for which parts are being made at the Hudson arsenal. Since Pontiac signed the original contract last spring the contract has been tripled and then doubled so Pontiac is now engaged in building a new gun plant which will be completed and ready for operation in February. Deliveries of guns made in Pontiac's present buildings are ahead of schedule.

Incidentally, plant visits, especially those of a nature intended to elicit information for publication have, of course, become a little bit

more complicated since the defense program settled down to earnestness, but they are not at all impossible. However, queer things happen every once in a while on these visits. For instance, it is learned that during one of Mr. Knudsen's inspection trips he was in the Ryan aircraft plant with a group of OPM-ites and some newspaper men and photographers. Not knowing one visitor from another, one of the Ryan officials started giving the low down on production figures to one of the guests and nearly fainted when he found out that he had been revealing confidential information to a reporter. The newsman was both reliable and patriotic so no harm was done. An aftermath is the fact that the figures appeared—in black and white—a few days later in a semi-official government publication which is available to anyone.

SOME plants have what appear to be odd regulations in effect. For instance, a news photographer got permission to work in an airplane plant near Detroit a short time ago and found that he could not bring in girl models to shed the usual glamour around the scene. An airplane company executive explained "It costs \$1,000 in lost output everytime a woman visitor walks through the engineering department or the shop." This is one objection the auto plants have never raised since they take large groups of tourists through auto-

mobile assembly plants each day. Or if they reckon the cost at all, it is probably written off as free publicity anyhow.

Selecting employees and training them for new defense jobs is a nation-wide problem and personnel men are eagerly swapping experiences for what they can learn from one another. Pontiac points out that employees' hobbies may provide important clues when seeking special skills. On a questionnaire many employees reported an interest in the ancient art of the gunsmith, the repairing of guns, gun collection and ornamental stock making. Stock making fitted in very well when Pontiac got the Oerlikon gun contract.

Similarly, when Briggs went into the airplane business, one Briggs executive turned to model airplanes as a source of information and education. A couple of scale model airplanes of the 10-cent store variety provided him with a quick way to brush up on some features of construction and to learn a great deal about nomenclature. Prior to his self-education terms like empennage, fuselage, elevators, flaps, ailerons, etc., had only vague meaning to him. He made use of the same device to teach quickly the green employees with whom he came in contact.

Now Carnegie-Illinois Steel Corp. has prepared a manual on aeronautics which includes a section on nomenclature intended to be useful to steel men.

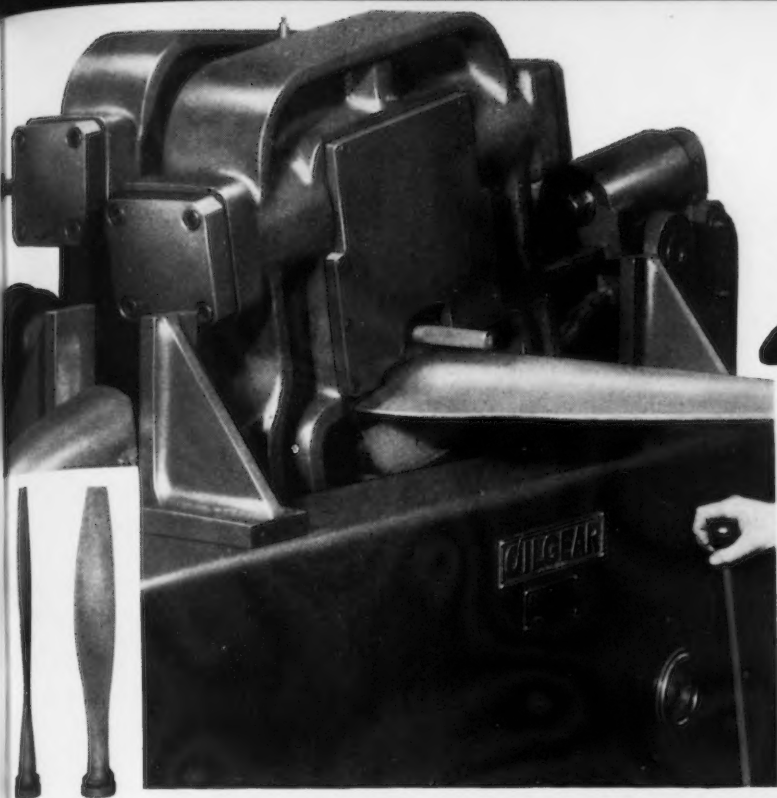
SEEN AT A RECENT OUTING of the Hartford chapter of the American Society of Tool Engineers are, from left to right, front row: Carl W. Moeller, Pratt & Whitney Division, Niles-Bement-Pond Co.; Harry E. Chellis, vice-chairman of the Southern Connecticut chapter, New Haven; Harry J. Hauck, Goss & DeLeeuw Machine Co.; Frank W. Curtis, Van Norman Machine Tool Co. and national president, A.S.T.E.; Henry Rockwell, Hamilton Standard Propellers; Daniel M. Jack, Pratt & Whitney Aircraft Division of United Aircraft; Henry I. Moore, Firth-Sterling Steel Co.; Max I. Farber, *Hartford Times*, and Frank J. Oliver, *THE IRON AGE*. Rear row: Kenneth F. Thomas, SKF Industries, Inc.; George G. Leitch, Colts Patent Firearms Co., and Ray H. Morris, Hardinge Brothers, Inc.



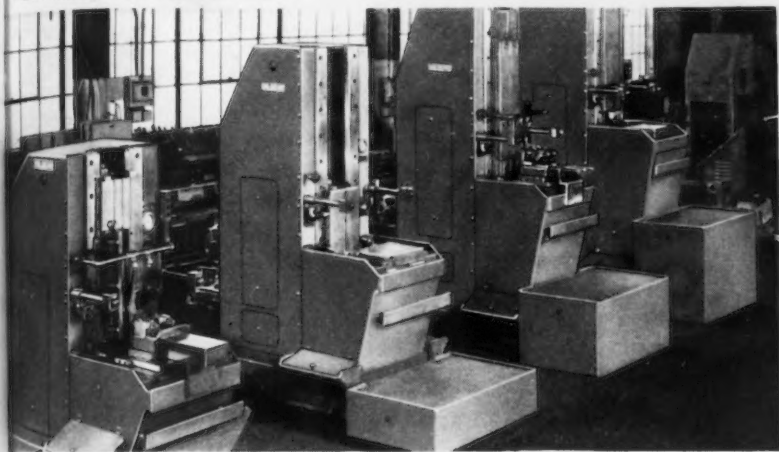


# Speed with Accuracy

## AT A TIME WHEN IT COUNTS



Oilgear Fluid Power Propeller-Twisting Machine. Quickly clamps blades and increases or decreases pitch of 7" to 14" airplane blades. Twists between various lengths. Permits blades to be forged very nearly to size. Reduces machining time to a minimum.



Above: Oilgear Vertical Broaching Machines. Used in automobile, tank, airplane, gun, truck, manufacturing plants. Permit *super-production* of ordnance parts, connecting rods and caps, main bearing caps, universal joint parts, etc.

Below: Oilgear Gooseneck Presses. In sizes from 6 to 300 tons. For forcing, broaching, assembling, straightening, stamping, manufacturing and general purposes.



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A thorough investigation of the Oilgear line of broaching machines, gooseneck presses, and specialized fluid power equipment of all kinds may suggest a method to break those bottlenecks which choke off your all-out production. A conference with an Oilgear engineer may prove worth while. He may have the answer to your problems in one of the many new manufacturing methods or processes which Oilgear has pioneered. THE OILGEAR COMPANY, 1324 W. Bruce St., Milwaukee, Wis.

Oilgear manufactures Fluid Power Feeds • Pumps • Cylinders • Valves  
Motors • Transmissions • Horizontal and Vertical Broaching Machines  
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# Washington . . .

• Administration's strenuous effort to make the nation war conscious would be more fruitful if it would clamp down on strikes and slowdowns which are interfering with defense output.



WASHINGTON—Eager as it may be for an "all out defense," the Administration hardly will convince the nation that it is exerting full-fledged zeal in that direction when it allows labor to run amuck to a point where strikes and slowdowns in defense industries assume proportions of a revolution. With one exception alone—the Vultee strike which occasioned the calling out of troops—did the Administration even affect the semblance, and it was only a semblance, of firm action against labor and even the President's supporters in Congress have criticized his weak appeals in that case.

This, of course, relates to the appeals made to John L. Lewis in the captive coal mine strike with its threat of absolutely paralyzing 80 per cent of the steel production, and thus completely wrecking the defense program. Lewis' defiance, however, aside from the magnitude of its implication was no more insolent than that of other labor leaders, save that they did not bandy words with the President. Just the same they have pulled strikes and slowdowns with equal ruthlessness, knowing that the Administration was anxious to see them move ahead with production at the greatest speed. Their ingratitude for what the Roosevelt

Administration has done for labor has been equally as base as that shown by Lewis.

THIS is not by any means intended to say that labor and Government are a matter of personal relations. Rather the point is that Administrative pampering of any group invariably develops in such a group the illusion that it has become greater than its creator and will turn upon the latter to gain self-seeking ends. Where the creator represents a government this means striking at the national welfare, and the only remedy is to put such a group in its proper place, definitely subordinate to the government.

So-called organized labor leaders, in the language of the street, "have asked for it." Whether or not the White House actually will go through with legislation to control labor remains to be seen but certainly many and possibly a majority in Congress, weak-kneed as it has been respecting the problem, are in a temper to throw legislative halters over labor now that the wave of strikes, capped by the captive coal mine strike, have been given scant, if any consideration.

ADMINISTRATION action to suppress unruly labor is one way of proving its earnestness in

the national defense drive, about which its spokesmen shriek hysterically as it urges the people to get back of it to the full, to "sacrifice" and to be prepared willingly to pay enormously greater taxes.

There is another way to sell the people respecting the sincerity of the defense program. This is to slash and slash sharply, instead of increasing as at present, the enormous non-defense expenditures. Cheap mouthings of government officials to the contrary, there is not the slightest effort at economy in non-defense expenditures. The opposite is true. While some of the enormously extravagant outlays are masked under the guise of "defense" costs, this pretense is so obviously ridiculous that often even those who share in the job grab express their amusement at it.

NEW and absurd alphabetical agencies continue to be set up amid the jungle and maze of previous money-squandering, boondoggling outfits, one piled upon another to make up a hideous, sprawling, clumsily incompetent bureaucracy of 1,500,000 civilian payrollers, albeit a highly effective political machine. This is almost 600,000 more than the peak employment

(CONTINUED ON PAGE 80)

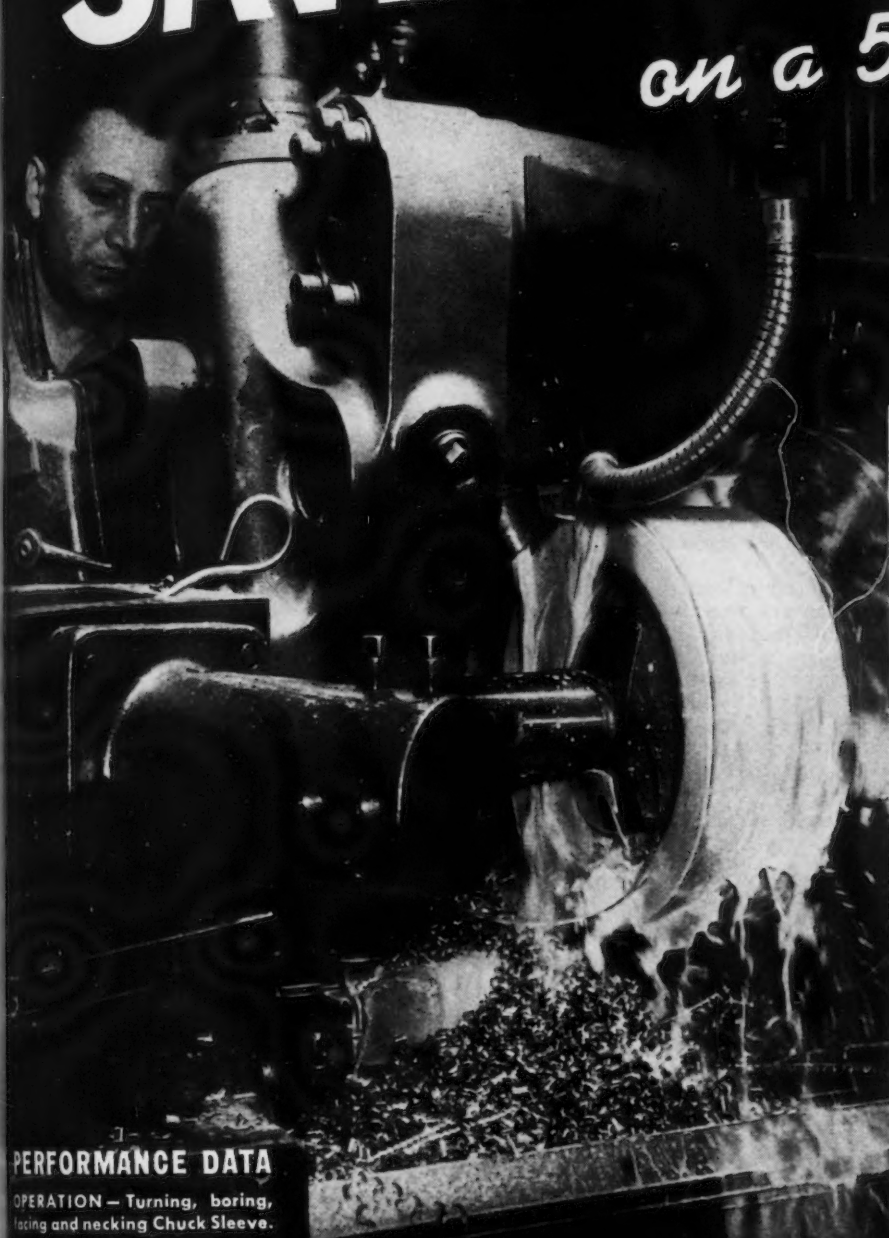
THE ARMY'S COMING: Richard T. Frankenstein, national director of the UAW in charge of aviation (center below), made the announcement that Army officers would intervene to supervise the rehiring of union members (as recommended by the National Mediation Board) in the Air Associates, Inc., strike at Bendix, N. J.

Photo by International





# SUNOCO *helps* SAVE 23 MINUTES *on a 50-minute job!*



## PERFORMANCE DATA

OPERATION — Turning, boring, facing and necking Chuck Sleeve.

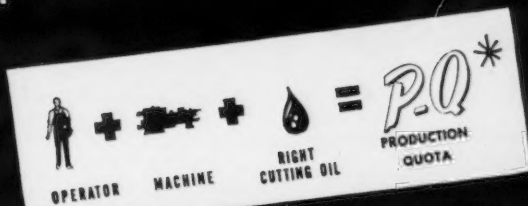
MACHINE — Warner & Swasey A-A Universal Heavy Duty Turret Lathe, with new Adjustable Single Turning Head.

MATERIAL — S.A.E. 3150 steel forging.

CUTTING SPEED — 200 S.F.P.M.

CUTTING LUBRICANT — 1 part Sunoco to 20 parts water.

Courtesy of  
WARNER & SWASEY CO.



# P-Q\*

## NEW HIGH **P-Q** SET IN MACHINING S.A.E. 3150 STEEL

Once again that perfect combination — skilled operator, good machine and SUNOCO Emulsifying Cutting Oil — teams up to make possible a new, higher P-Q\* (Production Quota) on an important cutting operation.

Formerly it took 50 minutes to machine this Chuck Sleeve. Now, using a new type Adjustable Single Turning Head, carbide cutters and SUNOCO Emulsifying Cutting Oil, it takes 27 minutes. The manufacturer adds:

"We readily appreciate the fact that the use of proper cutting oils is a big factor in helping us increase our turret lathe production."

Today the leaders look to SUNOCO for increased machine tool output . . . for the means to a higher P-Q\*. They know SUNOCO's high lubricating and heat-absorbing qualities permit deeper cuts at faster speeds, longer tool life, nth degree accuracy and fewer rejects.

Test SUNOCO in your own plant . . . under your own operating conditions. Call in one of SUN's "Doctors of Industry"—a metal working expert—for recommendations. Write or wire

**SUN OIL COMPANY • Philadelphia**

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# SUNOCO

EMULSIFYING  
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PETROLEUM PRODUCTS FOR ALL INDUSTRIES



**ENGINES OF WAR TO THE FORE:** Army officers and civic leaders celebrated "Defense Day" Oct. 28 at Schenectady, N. Y., at the plant of American Locomotive Co. A feature was the inspection of M-3 medium tanks, one of which is seen at left. William C. Dickerman, chairman of the board, indicated his company would erect new buildings for tank production and would double its present output, which is now about two tanks a day. He also indicated that within a matter of six weeks, a pilot model of the new M-4 tank would be completed. This model will have a cast steel hull and the 75-mm. cannon will be mounted in the main turret, with 360-deg. effective circle of fire.

## THE BULL OF THE WOODS

BY J. R. WILLIAMS



## Washington

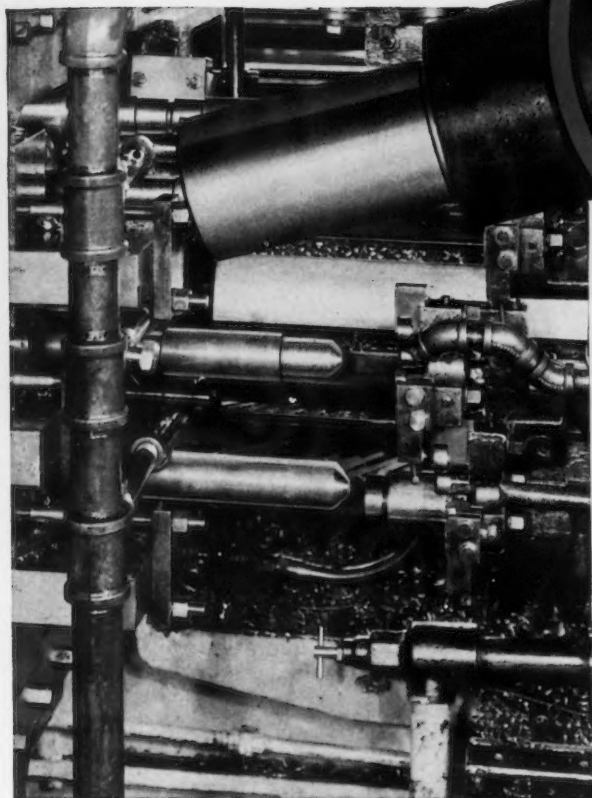
(CONCLUDED FROM PAGE 78)

on the civilian payroll during World War I. It is ridiculous to think that such an increase is necessary. Instead of making for efficiency it makes for inefficiency, fumbling, overlapping and a lack of coordination. Instead of decreasing the number of government agencies and personnel, the number of both is rising without check or hindrance.

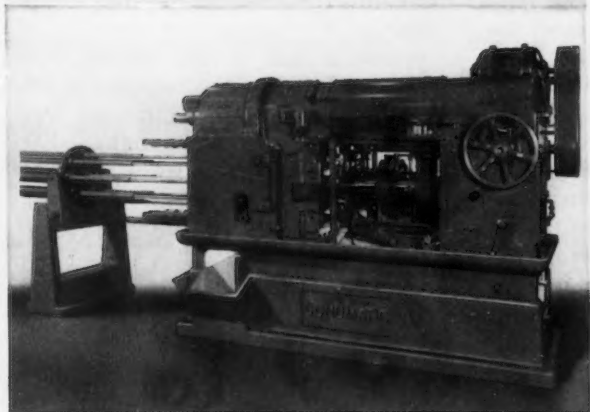
In other words the gravy bowl is to be kept flowing full tilt. The Treasury is being raided of bigger and better grabs. Waste is increased. Yet, taxpayers are urged to sacrifice more and more for "defense" when actually billions are drained from them to feed a political machine. Until and unless there is actual economy in non-defense expenditures, the country hardly can be expected to become "war conscious."



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This unique job is produced on a 2 $\frac{1}{4}$ " 8-spindle Conomatic equipped with a Cone Groove Roll Attachment. The transmission shaft is 9 $\frac{7}{8}$  inches long and 1 $\frac{23}{32}$  inches in diameter. The material is SAE 4140 bar stock. The grooving is one of seventeen machining operations, all completed within a cycle of 44 seconds.



## WITH AN ATTACHMENT FOR ROLLING OIL GROOVES DURING THE AUTOMATIC CYCLE

The rolling of the oil groove in the shaft shown above is another CONE FIRST. A device or attachment that increases facility without interfering with a machine's trunk-line efficiency is a device of merit.

CONE FIRSTS are engineered to give additional breadth of service to Cone Machines without interfering with their efficient trunk-line performance.

It will pay you to keep up with the CONE FIRSTS! Write today for particulars.



**CONE AUTOMATIC MACHINE CO., INC.**  
WINDSOR, VERMONT, U. S. A.

# WEST COAST . . .

• **Welders' strike, a rebellion against payment of dues to AFL unions, hampers industry everywhere on Coast . . . Westerners protest lack of representation on steel, other OPM advisory committees.**



**S**AN FRANCISCO—A strike of Seattle welders, starting two weeks ago in a small shipyard, spread like the measles last week through shipyards and industrial plants all over the Pacific Coast. Few concerns were shut down entirely but work was slowed down and hampered nearly everywhere.

Strikers were members of the United Welders, Cutters and Helpers of America, an independent union, rebelling against paying dues to from one to 15 AFL unions. Under the coastwise master contract for defense shipbuilding all workers must be members of AFL unions, so long as the AFL can supply the men; otherwise they must join the AFL union within 60 days.

Last month the United Welders asked for an AFL charter. Refusal to grant it was followed by discharge of a Seattle welder for refusal to pay dues to the boilermakers' union which in turn led to the tie-up that now has approximately 4000 men, chiefly shipyard workers, idle in the Seattle area. The strike next blossomed out in Los Angeles last week when more than 1000 welders in shipyards there responded to the strike call.

**I**RONICALLY, this strike directed not against employers, but against the AFL, is characterized by all the tactics against which the AFL, itself has protested so loudly when carrying on its own strikes.

At Seattle, where the independent union set up picket lines, AFL workers "scabbed" through in "flying wedges." At Los Angeles harbor, the independent union reported that four observers for the strikers were assaulted and badly beaten. Reminiscent of an adamant employer refusing to negotiate with strikers, AFL President William Green, loitering in the balmy California weather after the AFL convention, ignored the strike entirely during its first week. As the strike threatened to spread with incendiary rapidity, Mr. Green hurriedly left for New York for a conference with international labor leaders from all the democracies, including Latin America. Labor leaders and government labor officials on inspection tours to the Pacific Coast as the weather gets colder in the East, will have to be extremely chary of where they step, for the labor situation is honeycombed with thin-ceilinged burrows of potential strife, ready to cave in at any moment. Strikes emerging from the underground labyrinth at many points, such as the present welders' walkout, can be extremely embarrassing and hard to control.

Demands of the OPM last week that the striking welders return to work immediately were, of course, ignored. Sidney Hillman's recent tour of the Coast was far from a triumphal parade. He did little to dispel the prevalent belief that he came out here as a city man to civilize the Indians and left the belief, upon his return, that he had many more ideas on how to solve the contract distribution problem than the many labor difficulties which he left in his wake.

**T**HE most concrete proposal thus far for legislation to stop labor tie-ups comes not from the United States Department of Labor, the Labor Division of the OPM, nor from organized labor itself, but from Almon E. Roth, president of the San Francisco Employers Council and leading exponent of collective bargaining by employers. Mr. Roth proposed three remedies, none of them new, but all of them clean cut: 1. Provisions for cooling-off periods in labor controversies before strikes can be called. 2. Provisions for

secret-ballot, government-supervised elections among employees of our defense industries before strikes can be called. 3. Provisions against the use of the secondary boycott and hot cargo to enforce demands of union leaders. Such a bill has already been passed in California, even over the veto of the Governor, but is held up by a referendum invoked by organized labor.

Pacific Coast curbstone quarterbacks of the defense effort have been grumbling for some time over industry committees set up by the OPM. They grant that the Pacific Coast's contribution to national production has not been large up until the present time, but at the same time point out that expansions are probably greater here in proportion to present capacity than anywhere in the country, and that consumers' problems are more complicated than in other parts of the country due to the long freight haul. For instance, there is no Pacific Coast representation on any of the 18 subcommittees of the iron and steel defense industry advisory committee. Although the great bulk of the minute Pacific Coast steel capacity is controlled by Eastern firms, independents have been trying to get a foothold, and Pacific Coast fabricators, until the emergency kept them busy filling orders, constituted a vigorous group of dissenters. By no means the total of dissatisfaction with the way defense plant construction is being handled in this section came to the surface at Senate committee hearings this Summer, and speculators would make no mistake in giving odds that inquiry into the steel plant expansion program on the West Coast breaks out on the floor of Congress.

Western representation on other OPM defense advisory committees has not been heavy. None of the 14 persons on the non-metallic minerals committee comes from west of St. Louis, and there is no representation of the region west of Des Moines, Iowa, on the printing and publishing committee. One Western representative managed to break into the ranks of the waste material dealers, die casting, pulp and paper, and paper products committees.

Factory employment in the twelfth Federal Reserve district, comprising the far Western states, has expanded sharply and persistently since 1939. This increase has





Typical picture in American industry today—a battery of Ex-Cell-O Standard Precision Boring Machines turning out various defense parts with extreme accuracy, on a high production, low unit cost basis. Tomorrow, these same standard Ex-Cell-O machines—each of which is built for flexible use and ease of operation in precision work—will prove profitable to their owners when the swing over to non-defense products must be made.



**S**weet music to the ears of today's buyers of Ex-Cell-O precision machines will be the steady sound of those same machines in operation tomorrow . . . when world peace will bring a definite advantage to manufacturers in this country whose present equipment can be adapted to civilian needs, quickly and profitably, and still meet the new high standard of speed and accuracy in production.

Every standard Ex-Cell-O machine—for boring, for

grinding threads, for other precision machining—is designed and built to do most efficiently and at low cost the extremely accurate job demanded today for defense . . . to meet these same exacting requirements that will unquestionably be essential tomorrow if profits in competitive markets are to be assured.

*Wherever an Ex-Cell-O precision machine is installed today, one of the most important steps in the planning for the inevitable tomorrow is already taken.*

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*Precision* THREAD GRINDING, BORING AND LAPPING MACHINES, TOOL GRINDERS, HYDRAULIC POWER UNITS, GRINDING SPINDLES, BROACHES, CUTTING TOOLS, DRILL JIG BUSHINGS, PARTS

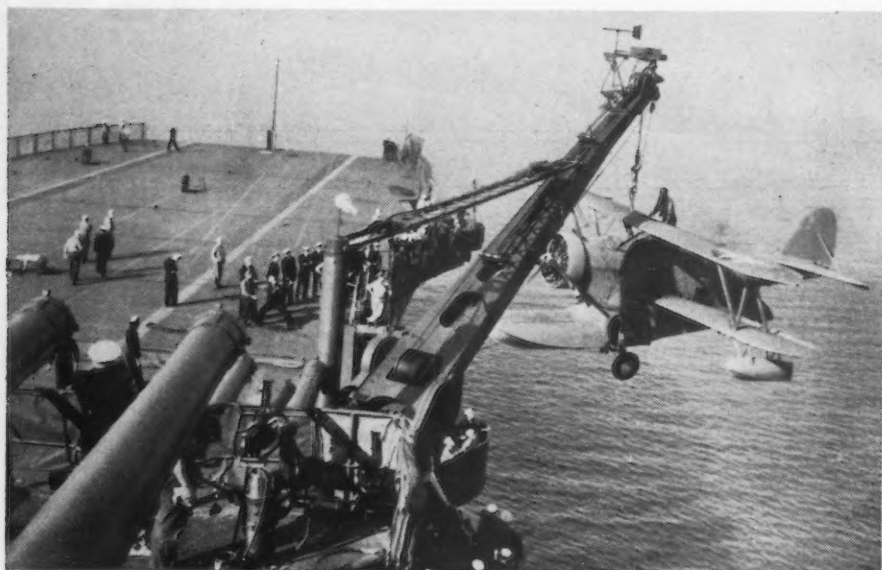


Photo by Press Association

**PLANE HOIST:** A Grumman amphibian observation plane is hoisted aboard the U. S. Lexington as the aircraft carrier leaves drydock in San Francisco for San Diego speed trials.

been reflected in an advance in the seasonally adjusted index of industrial employment in Pacific Coast states to 180 per cent of the 1923-25 average in August from an average of 110 for the year 1939.

**C**URRENTLY about 70 per cent of all wage earners in the twelfth district manufacturing establishments are employed by the aircraft, shipbuilding, lumber, food and kindred products, and metal and metal products industries, after allowance for seasonal factors. An additional one per cent are employed at petroleum refining, a line of activity in which employment is small relative to value added by manufacture.

The affiliated Lockheed Aircraft Corp. and Vega Airplane Co. last week became the first organization in the country to hire 50,000 employees solely for the manufacture of airplanes. Lockheed today has 39,000 on its payroll, while Vega has 11,000. One year ago there were only 15,500 employed by the two companies and 30,000 new employees have been hired since January of this year. Lockheed, incidentally, during the third quarter of 1941 delivered approximately 41 million dollars' worth of airplanes, almost equalling the \$44,936,594 worth of planes delivered during the entire fiscal year of 1940. This record is all the more spectacular,

because it represents combat planes rather than trainers. The deliveries comprise P-38 pursuit interceptors for the U. S. Army and Hudson bombers for Great Britain.

**I**N order to facilitate development of Eastern sub-contracting work for the firm, North American Aviation has opened an office in Cleveland.

North American purchase of outside labor, parts, and materials will reach an estimated total of \$100,000,000 for the year 1941, as compared with \$45,000,000 in 1940.

At the present time, company officials estimate that North American's three factories in Inglewood, Cal., Dallas, Tex., and Kansas City, Kan., are "farming out" or sub-contracting 30 per cent of their total production to large and small manufacturers throughout the nation. This work is going to 65 major sub-contractors engaged in building assemblies of North American design, and to more than 900 suppliers of parts and materials.

Illustrating the expansion of sub-contracting accomplished by the firm, it was recently announced that only 15 per cent of North American production was being sub-contracted six months ago.

Early in October company officials estimated that the present 30 per cent could probably be increased to 34 per cent within the

next few months, but it is now anticipated that placement of new sub-contracts as a result of the activities of the Cleveland office may raise the percentage of outside work still higher.

In addition to seeking new sources of supply for outside production, the Cleveland office will take over outside production follow-up work previously handled for North American in the East by the Fisher Body Division of General Motors Corp. in Detroit.

### Canada Computes Saving In Consumer Goods Cut

Ottawa

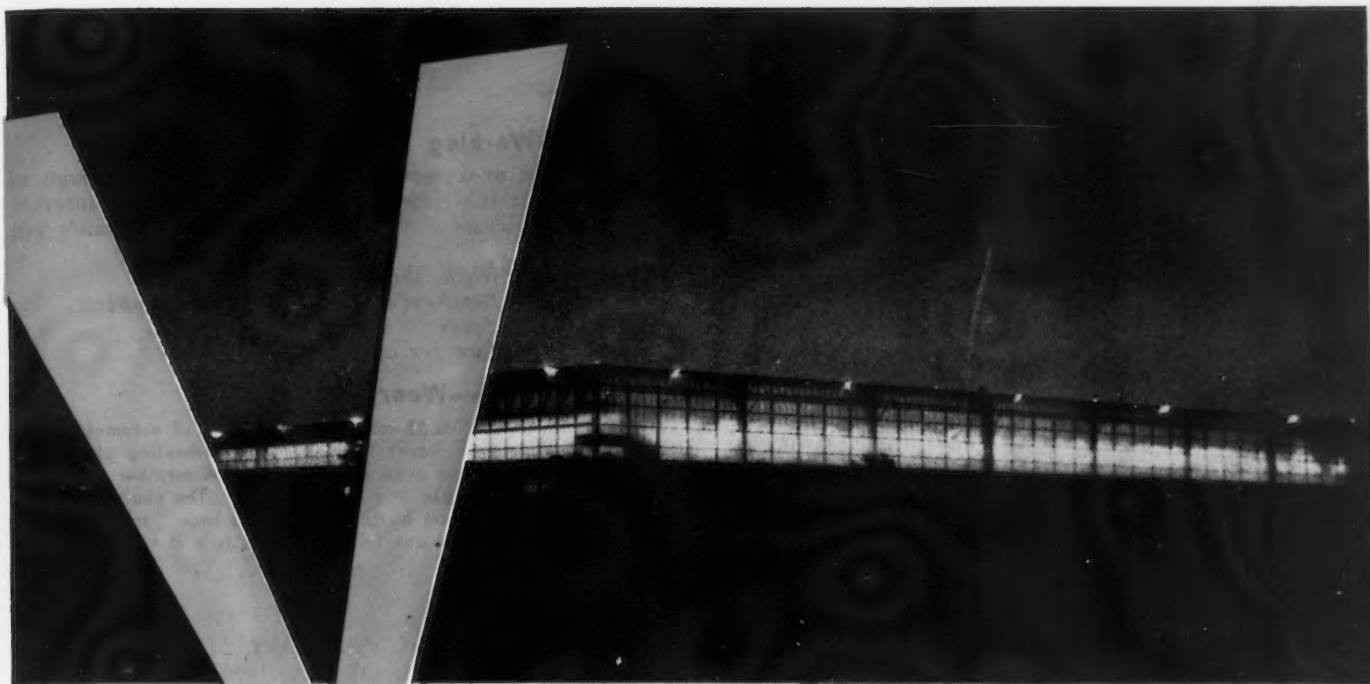
• • • By reducing output of washing machines and radios 25 per cent, Canada will save thousands of tons of raw materials which will be made available for building of guns, tanks, airplanes and other instruments of war. According to C. D. Howe, minister of munitions and supply, curtailment in production of these two items alone will mean a saving of 1820 tons of steel, all kinds; 850 tons of iron, cast, hot rolled bars and pipe; 85 tons of aluminum; 50 tons of brass; 92 tons of copper; 100 tons of zinc; 25,000 electric motors; 5000 electric switches; 2200 gas engines; \$1,375,000 worth of ceramics; \$1,500,000 ball bearings; \$1,375,000 paper tubes; \$125,000 glass dials; \$750,000 tubes. Upwards of 85 per cent of the material used in making tubes is imported from the United States.

### Three Firms Get Awards For Aid to National Defense

Washington

• • • Lawrence D. Bell, president of Bell Aircraft Corp., Lester A. Moehring, comptroller of Chrysler Corp., and Milton Tibbetts, vice-president and patent counsel of Packard Motor Car Co., received award certificates Nov. 1 for their firms for aiding national defense from George Washington University, through its law association. The awards were made by Dr. Cloyd Heck Marvin, president of the university and Harry H. Semmes, president of the law association, at the annual dinner of the law association, held at the Mayflower Hotel, Washington.





## VULTEE finds it pays to **TRUSCONVEY** plant materials

**FAST ACTION!** That's the pass-word in the big, new Vultee aircraft plant at Nashville, Tennessee!

Parts and materials must be *efficiently* stored, ready for *efficient* movement to assembly lines.

That's why Truscon Steel Boxes and Skid Platforms were chosen for materials handling equipment by Vultee. Just as in many other installations, these Truscon units solved a wide variety of handling problems, simplifying operations and speeding production.

Truscon Steel Boxes and Skid Platforms are designed to meet the particular requirements of each individual material handling job you have. Truscon will study handling conditions in your plant and make recommendations without obligation. Write Truscon Steel Company, Pressed Steel Division, 6100 Truscon Avenue, Cleveland, Ohio. Subsidiary of Republic Steel Corporation.

*Other Republic Steel products used in the Vultee plant were steel windows, hangar doors, metal lath, channels, corner bead, wire mesh, steel sheets for siding, reinforcing bars, nails, pipe, conduit, shelving, stacking boxes, tool tote boxes, files and storage cabinets.*



*Note the sturdy strength of these boxes and skids*



*Space-saving is a Truscon box and skid platform feature*

### Investigate **TRUSCON** Foundry Flasks

Light weight...durability... strength where strength is needed...easily rammed and shaken out... these are features of economy and production you get in TRUSCON foundry flasks. Write for descriptive literature on complete line.



# Truscon

**MATERIALS HANDLING EQUIPMENT**

**You'll find it will pay to TRUSCONVEY your plant materials**

# Fatigue Cracks

BY A. H. DIX

## Lowdown on Sitdown

• • • Our mail is heavy this week, indicating overtime work by this page's eighteen loyal readers. We will give the floor first to Deac, who writes:



You asked recently if anyone could explain why the girl photographed on the hood of the new Nash seems to be resting on air.

This connoisseur in Sitzfleischhabend can solve the mystery. The reason is that when flesh is compressed between its owner and an unyielding surface, there occurs a lateral bulge, which is known among metallurgists as creep.

Mortensen, the great photographer, gives full directions in his book, "The Model," for avoiding displacement. Briefly, the methods are supporting the weight on the hands, feet, elbows, etc., and a shifting of weight . . .

Deac's explanation of the *why* is enlightening, but unsatisfying as to the *how*. The photograph shows no evidence of strain in the fingers. The correct answer is, we believe, given by Bill ("The Assembly Line," see page 74) Sherman, who says that a support, not visible in the photograph, was used.

Furthermore, Deac misuses the word creep. Metallurgically it means a kind of permanent deformation and is therefore unsuited to the present instance, in which a removal of the stress results in restoration of the original contour.

## Greenpernt Joke

• • • H. G. Herrick says he heard this conversation in his drafting department:

1st draftsman: "What do you put on a drawing that you do not want? Cancelled? Obsolete?"

2nd draftsman: "I just put void."

1st draftsman: "Yes, but what void?"

## They Made Us Blush

• • • We thought our capacity for absorbing praise was unlimited, but the fervor with which loving readers are lauding the Priorities Guide (you got it with the Oct. 25 issue) leaves us as red as a deacon in Minsky's. Telegrams pour in from all over; our switchboard operator is as busy as a psoriatic juggler, and our mail man can now definitely pass a pig in an alley without side-stepping.

The priorities chief of one of the big companies told us this over the telephone:

"Say, I wonder if you fellows know what you have there in that priorities guide. I'm paying thousands of dollars for special priorities services, but what you have worked up is the best yet. You've done all the work for me. How much for a couple hundred extra copies and how do I keep it up to date?"

We quoted him these prices:

1 to 10 copies	25¢ each
11 to 100 "	20¢ "
101 to 300 "	18¢ "
300 to more "	15¢ "

and told him that the changes are reported each week on the Priorities and Prices page (see page 128).

Frankly we didn't know the Guide was that good, but the brains department knew it all along, and our admiration for its judgment hits a new high. "How do you keep hitting the jackpot time after time?", we asked. "Well," we were told, "we have a formula. We find out what the customers want and we give it to 'em."

## Metal-Working Industry's John Kieran

• • • An anonymous Philadelphian is good enough to contribute the entire verse said to have been inserted in hymn books distributed free by the Beecham's pill people:

*Hark, the herald angels sing,  
Beecham's pills are just the thing;  
Peace on earth and mercy mild,  
Two for adult—one for child.*

## It's Formal—Wear a Tie

Bill Sherman, that 25-volume encyclopedia of automotive lore, writes that at a recent technical society meeting plans were being made for the annual get-together. A member suggested, "This year let's make it a formal affair." The chairman asked, "What do you mean by formal?" "You know," said the member, "something you can bring your wife to and not fall on your face."

## Bull Stolen

• • • At 10:25 P.M. Friday, Oct. 24, five minutes before the National Metal Show became history, a life-size reproduction of "The Bull of the Woods" was stolen from The Iron Age booth. The facts as given by our representative, Samuel I. DeWolf, are:



This is the Bull that was stolen.

"Along about 10 P. M. a group of University of Pennsylvania students came along and lifted the Bull right out of our booth and started walking down the aisle with him. I went after them, and after some little trouble, recaptured the Bull and replaced him smack in the middle of the booth where I could keep a better eye on him.

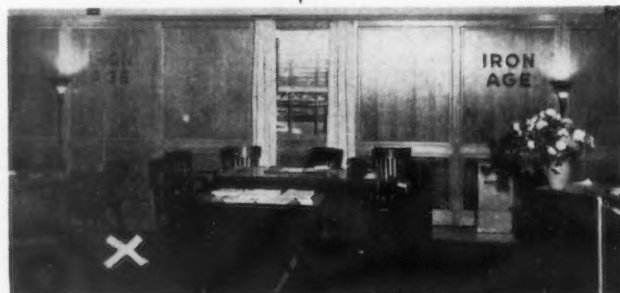
"All went well for a while, and then some SKF men came in and asked if they could have him for their shop. I said no.

"I'm still watching like a hawk, when some boys from Worth Steel came along and tried to abduct him. They were b-i-g men, but bravelike I held my ground.

"But I got thirsty and stepped out for a drink—of water. It was 10.25 P.M., five minutes before the show closed. When I got back the Bull was gone. In the rush of everyone to get out it was impossible for me to find the kidnapers. I have a faint idea that Worth Steel were in league with the SKF boys, or maybe the Penn students."

A reward will be given for the return of the Bull or for information leading to his recovery. Please send clues to agent X-13, care THE IRON AGE.

This is the booth from which the Bull was stolen. X marks the spot.



## Problems

• • • Last week's family problem came out this way: girl's age 16, boy's age 20, wife's age 36, husband's age 48.

If this one, sent in by Thomas Cannarella, takes you more than ten minutes, for shame!

One hundred people are employed in a certain plant. They are paid at the end of each day, the men receiving \$5, women \$1 and boys 5¢. The daily payroll is \$100. How many men, women and boys are employed?





## **This bulletin will help you select heat treating equipment for your armament work**

**F**URNACES FOR ARMAMENT, available now, discusses the application of heat treating furnaces to practically every one of the major types of contract work being allotted today. All of the information presented is based on practical data obtained in installing furnaces for armament work.

A section of the bulletin is devoted to each of the following: Aircraft Parts, Cartridge Cases, Gun Mounts, Cartridge Clips and Links, Machine Gun Parts, Tools and Dies, Bullet Cores and Tank Parts.

Actual installation photographs are given in all cases. FURNACES FOR ARMAMENT shows what equipment is being used, and how it is being used

to meet the close specifications called for today. It is available for the asking. Your copy will be mailed promptly.

**LINDBERG ENGINEERING COMPANY**  
2450 W. HUBBARD STREET, CHICAGO

### **Heat Treating in the Movies . . .**

The editors of "Heat Treating Hints" present a full-length sound-on-film Kodachrome movie entitled "Heat Treating Hints." Here is a film prepared by practical heat treaters for their fellow craftsmen and the younger men in heat treating. Practical, instructive, it illustrates valuable tips on the best modern heat treating practice. Make your arrangements now to show "Heat Treating Hints" at your plant or chapter meeting.

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# **LINDBERG FURNACES**

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# This Industrial Week . . .

• • •

**H**OW the priorities system can be altered to speed defense production and permit civilian industries to get some of the material they need to live, took top rating this week for the attention of industrial and defense agency leaders.

To answer some of the criticism that wholesale issuance of priorities is far from (1) getting the needed materials to defense plants and (2) evenly and fairly distributing the leftover material to non-defense plants, the Supply Priorities and Allocations Board has asked OPM to develop a direct allocation system for steel.

This step followed an appeal by Army and Navy officials that deliveries of structural steel, nickel steel, high-speed steel, tool steel and steel plate for defense purposes could no longer be solved properly through the priorities system alone.

To a large section of industry—particularly the largely “forgotten plants” making non-defense products and unable to get defense orders—the fact that the priorities system is not making history by its successes in distributing vital materials and equipment suggested the SPAB announcement did not come too soon.

To another large section of industry, forcing an allocation system on industry “all at once” would threaten a complete breakdown in distribution of materials. It recommends a gradual changeover from

## Favor “Slow” Allocation

the present system into a combination priorities-direct allocation system and reflects a feeling that, in the steel industry, for example, no government agency can schedule the heats and rollings of a steel plant. The scramble to get material when the suddenly-acquired power to distribute it rests with an advisory committee of industry and defense agency members would, indeed, be something to see.

Outcome of the move to replace the present priorities system with something better is likely to result in a slow revision over the next few months in the method of distributing materials.

Meanwhile, effects of priorities on the metal industries were shown this week in final returns in THE IRON AGE priorities poll in which approximately 2000 companies took part. The poll showed that the conversion of

## Priorities Loss For 500

civilian production plants to defense goods is farther along than is generally believed, with companies in the poll reporting an average of 65.12 per cent of their current operations for defense. Eleven hundred and seventy-eight companies of the 1897 submitting complete answers in the survey said their rate of production has not been affected by priorities, but an even 500 companies report priorities losses.

Six hundred and thirty-six companies told THE IRON AGE they are short of steel, although not all of this number had actually been forced to cut operations for that reason. Three hundred and seventy-four companies said they are short of non-ferrous materials such as copper, aluminum and zinc, to a degree which has in most cases cur-

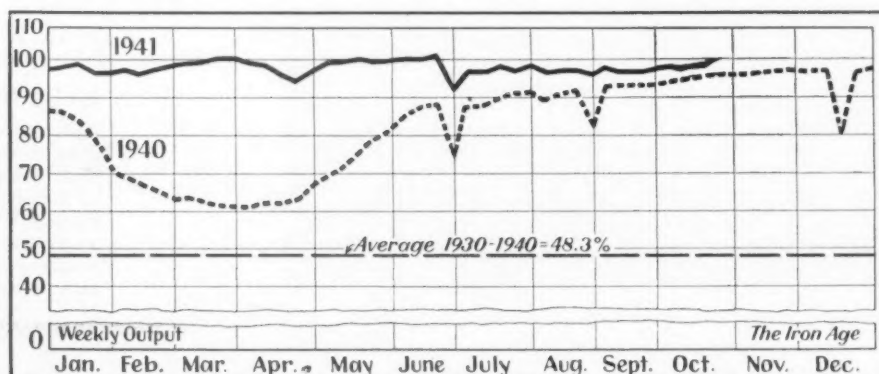
tailed operations while 146 companies declared their production has been handicapped by shortages of machine tools and small tools of various types. Seventy-nine of the 1897 companies mailing full answers in the poll said they could operate at a higher rate if they could find more skilled workmen. Latest to attack the priorities system is the SWOC which now claims that 55,000 workmen have already suffered “priorities unemployment” and that the jobs of an additional 45,000 are threatened in the steel and allied metal industries. The union makes no comment on loss of defense production due to strikes.

Industry and the public have been given a short breathing space by John L. Lewis, labor dictator, who has authorized the steel company-owned coal mines to operate without interruption until Nov. 15 while the National Defense Mediation Board studies his “a closed shop or else” proposal for the mines. The possibility that the four employer and two public members of the mediation board will

## Coal Strike Off For Time

outvote the five labor members on the coal mine closed shop issue, with its potentialities of an outbreak of closed shop shutdowns in steel and other industries, has not been entirely cast aside but most observers at mid-week believed Lewis would get what he wants from the board. As a after-

**Steel Ingot Production—Per Cent of Capacity**  
(Open Hearth, Bessemer and Electric Ingots)



**Steel Ingot Production, by Districts—Per Cent of Capacity**

	Pitts- burgh	Chi- cago	Val- leys	Phila- delphia	Cleve- land	Buf- falo	Wheel- ing	De- troit	South- ern	S.Ohio River	West- ern	St. Louis	East- ern	Aggre- gate
Current Week	100.0	101.0	94.0	91.5	99.0	92.5	94.0	103.5	99.0	100.0	96.0	99.0	102.0	98.0
Previous Week	97.0*	103.5*	94.0	91.5	102.0	94.5	94.0	112.5	99.0	105.0	97.0	99.0	104.0	97.0*
*Revision														



math of the Taylor-Lewis-Roosevelt conferences to end the coal strike, it was said that in these meetings Mr. Taylor did not officially represent either U. S. Steel Corp., of which he formerly was chairman, or the steel industry as a whole. He had been called into the dispute by President Roosevelt. In the meantime, the coal strike problem must be labeled "unfinished business."

Steel production was down little because of the captive mine coal strike, which was stopped in its early stages, but several thousand

### Ingot Output Up A Point

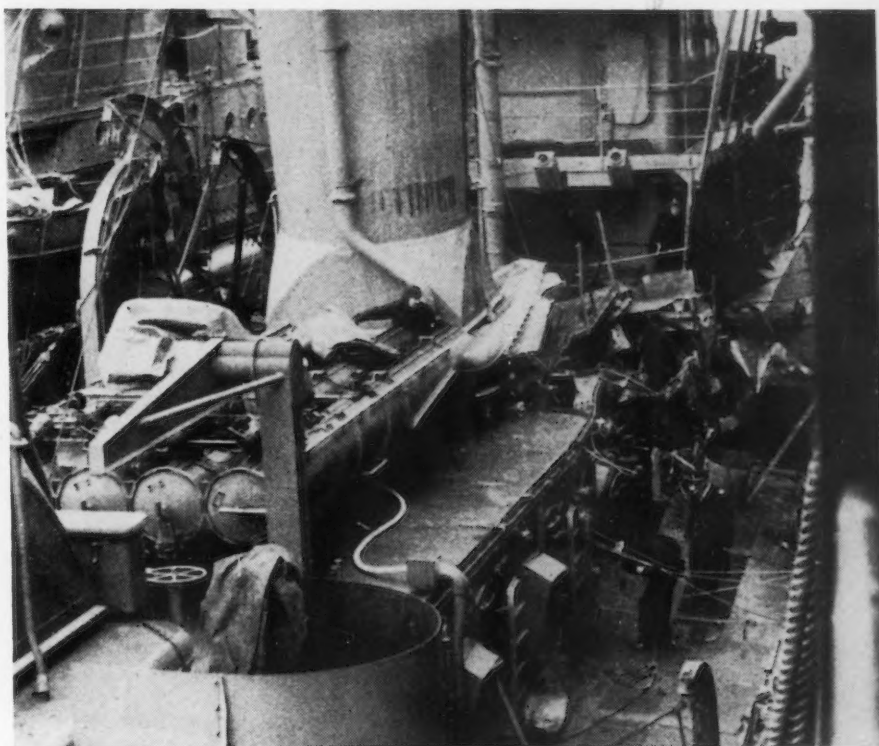
tons of steel were lost at Pittsburgh when a crane-men's strike at the Homestead, Pa., works of Carnegie-Illinois Steel Corp. resulted in suspension of several open hearth furnaces. This is another example of the "flash" strikes which are continuously interfering with steel production. The result in this case will be delay of structural material needed in national defense. At Homestead as, in many other plants, a few men tied up production at a strategic point and forced many hundreds of workers into temporary idleness. The Homestead tie-up was caused by 200 crane-men but 3000 men lost from two to three days work. Pay envelope losses by non-striking workmen in such strikes may result eventually in a decline in these "outlaw" defense-hampering shut-downs.

Steel ingot production this week rose to 98 per cent, a gain of one point from last week's revised rate of 97 per cent. Although October bookings were not as heavy as in the record-breaking month of August, new orders did run from seven to 15 per cent ahead of the September figures. The

### Backlogs Still Gain

volume of fresh business in October ran ahead of production with the result that backlogs were increased slightly. Steel industry backlogs are now estimated at five to seven months' operation at the current production rate. In the last few days, bookings have continued to exceed production.

Iron and steel scrap shipments



**DECK VIEW OF THE KEARNY:** This is a view of the damage to the deck of the U. S. destroyer, Kearny, following its torpedoing off Iceland. The Kearny was not sunk but the Reuben James, another U. S. destroyer, was sunk on Oct. 30 in the North Atlantic. (Pictures are lacking of the sinking of the Reuben James.)

still are below requirements and dealers are intensifying their efforts to get more material. Eugene G. Grace, president of Bethlehem Steel Co., reports that a total of seven open hearths at three plants, Lackawanna, N. Y., Bethlehem, Pa., and Johnstown, Pa., are down because of lack of scrap. Describing the situation in scrap as "still a headache" he said his company is striving to improve its position by building two new blast furnaces with annual capacity of 800,000 tons. An open hearth at Chicago went down last week for lack of scrap.

For another week efforts by industry to broaden the present "limited production" stage of the national defense program were increased and were getting results. A steel cartridge case, long sought by many countries in wartime, is said to be near success in U. S. arsenals. Improved knowledge of metallurgy has strengthened the prospects of a successful steel cartridge and a lessening of the strain on copper, currently one of the tightest of defense materials. Another development of the past

week is a plan for building a very large fleet of stainless steel cargo airplanes for sale to South American republics. An order for 1000 planes, said to be the first all-stainless type to go into mass production anywhere in the world, will be awarded shortly to the Edward G. Budd Mfg. Co., Philadelphia, pioneer in the stainless fabricating field, and Fleetwings, Inc., builder of several part-stainless planes. Stout Skycraft Corp. of Detroit is building fuselages for the planes.

Structural steel awards dropped to 6900 tons from 13,925 tons a week ago, the only large award being 3000 tons for a factory at Toledo, Ohio, for the American Propeller Co. New structural steel projects of 20,650 tons are almost double those of last week, however, with the new jobs including 2810 tons at Stickney, Ill., for a blower house and sewage works for the Chicago sanitary district, 2350 tons at Oakland, Cal., for three warehouses for the Navy and 2210 tons for a blast furnace at Lackawanna, N. Y., for Bethlehem Steel Co.



## Could you spread your Stainless *Thinner?*

★ If you manufacture a stainless product which requires the alloy characteristics on only one surface, then single-armor Pluramelt is a material you ought to investigate.

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Let us tell you more about this exclusive material, as it may apply to your products. Just mail the coupon below.



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# News of Industry

• • •

## Poll Finals Show 65% of Plants on Defense, Hundreds Short of Materials

• • • The difficult change over from peacetime products to wartime products is already well under way in many industrial plants in the U. S., and scores of plants are working 100 per cent for the national defense program.

In a poll just completed by THE IRON AGE of a cross section of the U. S. metals industry, the average percentage of production on defense materials and equipment was 65.12 per cent.

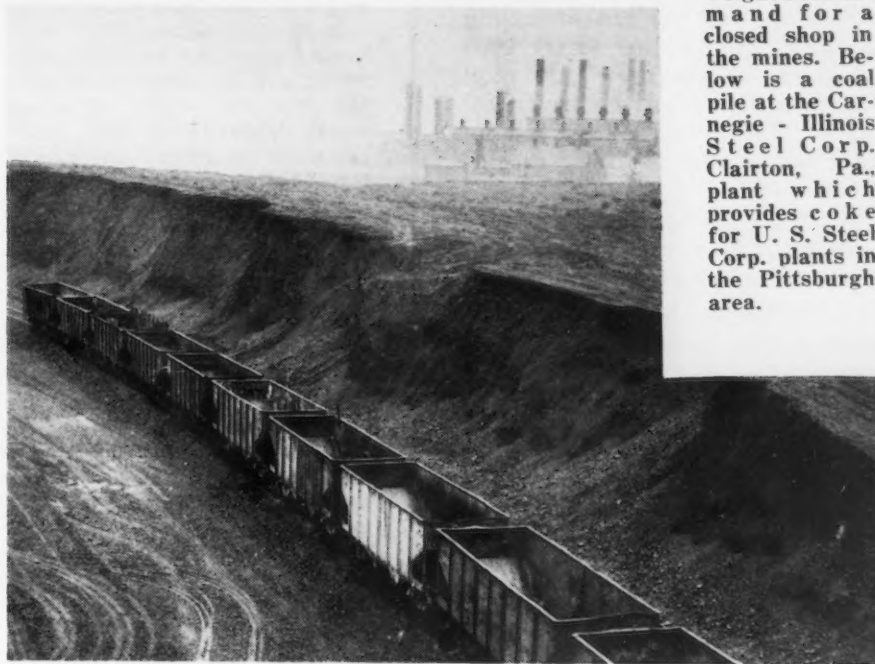
Since almost 2000 companies participated in this survey, taken to determine the effects of the priority system on industrial activity, the results indicate greater speed in the designing, tooling-up and production stages of the defense program than expected.

Of the 1897 companies submitting complete answers in THE IRON AGE poll, an even 500 declared that their operations had declined as a result of priorities which prevented them from obtaining the necessary materials. Eleven hundred and seventy-eight reported no loss in output so far from the present system of material distribution while another 204 companies did not answer the question: "Have priorities reduced your production?"

More companies reported shortages of various materials and complained of the effects of priorities than reported actual slowdowns or shutdowns of their plants. Thus



**SITTING ON TOP:** John L. Lewis, head of the CIO-United Mine Workers Union, has again demonstrated his power by shutting down steel company owned coal mines, ignoring three appeals by President Roosevelt to reopen them, then offering the government a truce of 15 days during which Lewis offered to permit the mines to operate while the National Mediation Board weighed his demand for a closed shop in the mines. Below is a coal pile at the Carnegie - Illinois Steel Corp. Clairton, Pa., plant which provides coke for U. S. Steel Corp. plants in the Pittsburgh area.



Photos by Wide World

636 of the 1897 companies participating in the poll declared that they are short of steel. Some of these said that operations had been curtailed, others that inventories had been cut and many indicated that they could operate at a still higher rate if they could get the material.

A piling up of priority ratings in a way to divert more steel than is necessary to some plants, leaving less steel than needed for other plants in the non-defense or part-defense group, is indicated by THE IRON AGE poll.

A breakdown of the total of com-

panies reporting steel shortages (one-third of the total reporting) shows the following shortages of specific steel items:

Sheets .....	86	Structural shapes .....	23
Pig iron .....	42	Strip .....	19
Plates .....	45	Cold rolled .....	19
Bars .....	45	Small shapes .....	18
Alloy steel .....	37	Forgings .....	14
Scrap .....	27	Tubing .....	17
Castings .....	31	Galvanized .....	13
Wire .....	26	Tin plate .....	1
Tool steel .....	26	Cobalt steel .....	1
Stainless .....	25	Carbon steel .....	12

Companies reporting shortages of other metals totaled 374 of which 101 said they lack brass, 61 are short of copper, 67 of alumi-

num, 30 of bronze, 25 of zinc, seven of chromium, five of nickel-silver, nine of cadmium, three of monel, and one each of lead, magnesium, manganese and molybdenum.

One hundred and forty-six of the 1897 companies participating in the poll said their operations have been affected by a shortage of machine tools and small tools of the following classifications:

Small tools, cutters .....	63	Punch presses .....	3
Screw machines ..	6	Boring mills .....	2
Grinders .....	6	Milling machines ..	5
Lathes .....	9	Automatics .....	1
		Presses .....	2
		Miscellaneous .....	8

Shortages of some types of machine tools reported some months ago apparently have ended. One of the greatest defense bottlenecks of a year ago was the lack of milling machines but of the nearly 2000 companies answering THE IRON AGE priorities questionnaire only 5 report that a scarcity of milling machines is affecting their rate of production.

A total of 230 companies declare that they lack other materials and are thus kept from reaching capacity production. This total includes:

Motors, etc. ....	22	Auto parts .....	3
Bearings .....	12	Corrugated cartons ..	7
Chemicals .....	11	Lumber .....	3
Hardware .....	15	Plastics .....	6
Repair parts .....	8	Rubber .....	5
Welding rods .....	7	Paper board .....	3
Gages .....	6	Chain belts .....	1
Plastics .....	4	Wire cloth .....	1
Plating supplies ..	4	Cork .....	1
Paints, enamels ..	4	Cable .....	1

Other equipment of which the reporting manufacturers are short include dies for casting, 2; compressors, 2; heaters and furnaces, 2; valves, 1; and die casting molds, 1.

Lack of skilled labor is a more important factor in reducing operations than some of the materials under priorities and 79 of 1887 companies said they could operate at a higher rate if they had employees in the following classifications (the numbers again refer to companies):

Machinists .....	5	Iron workers .....	1
Tool makers .....	5	Welder .....	1
Molders .....	4	Yard man .....	1
Die, pattern makers .....	3	Punch press operators .....	1
Screw machine men .....	3	Lathe operator ..	1
Assembly men .....	2	Sheetmetal mechanics .....	1
Tool designers .....	1	Other mechanics ..	2
Metal spinners .....	1	Grinder operators ..	2
Core makers .....	1	Nipple machine operators .....	1
Gage grinders .....	1		

*NOTE: Many of the more than 1800 defense and non-defense manufacturers answering an IRON AGE questionnaire regarding effects of the priorities system volunteered additional information. Some of the "written in" quotations from the questionnaires are presented here.*

**Railway Equipment Maker, Ohio:** "We are operating full time but could employ more men if we could get material. From 50 to 60 per cent of our output is for defense."

**Steel Fabricator, Ohio:** "The percentage loss in our production is 20 per cent. We do not blame this loss on priorities as we would have had trouble getting sufficient steel bars without priorities."

**Foundry, Ohio:** "If the present (priorities) plan is continued, our operations probably will result in a loss as soon as a small stock of materials is consumed."

**Tool and Die Shop, Michigan:** "We have on order the material for \$100,000 worth of aircraft work, delivery past due, and no prospects of getting the raw material before Jan. 1, 1942."

**Boiler Plant, Ohio:** "It keeps one man on priorities full time. We have no union and have had no labor trouble so far."

**Foundry, Ohio:** "Orders for non-defense castings are becoming scarce and delivery dates are being deferred due to government rejections."

**Makers of Steel Greenhouse Members, Ohio:** "Our present stocks of steel are running low and prospects of further mill shipments are not good."

**Auto Parts Plant, Michigan:** "We have had no loss so far due to priorities but losses will occur as a result of the new limitation orders P-54 and P-57."

**Steel Furniture Maker, Pennsylvania:** "The man-hours lost per month has increased because of substitutions."

**Hardware Products, New York:** "Inability to obtain brass will seriously curtail operations within six months."

**Water Tank Installer:** "I have one month's supply and have been informed by the OPM in Washington it is not able to help us get more material (steel). Plant must close down."

**Stove Manufacturer, New York:** "Operations in our press department dropped 75 per cent this week. We have been running full up to present week."

**Machinery Builder, Illinois:** "All materials on defense subcontracts being furnished by prime contractors. We are short of all kinds

## Fifty Companies

of materials. We have too many orders for the amount of materials and labor available."

**Foundry, Ohio:** "Our production seems to have been cut due to slowing of the melting process brought about by our inability to get the proper scrap which would enable us to get the maximum melt from our equipment."

**Auto Parts Maker, Michigan:** "Things are getting tighter and we look for some slow-up before the end of the year."

**Pipe-Making Equipment, Ohio:** "The shortage of steel has caused us to lengthen delivery schedules but has not resulted in a loss of production. Also experiencing shortage of other metals and tools but no loss of production as yet."

**Stove Plant, Missouri:** "We have been fortunate so far in receiving materials. We have had to go to warehouses for some steel."

**Lamp Parts Maker, Illinois:** "We may be affected soon by a shortage of chemicals for plating."

**Machinery Maker, Wisconsin:** "Have had no loss in operations due to priorities so far but next month's will be high."

**Hardware Manufacturer, Illinois:** "Operations will be cut soon because of a shortage of steel."

**Pipe Nipple Maker, Pa.:** "We cannot figure the loss up to date and be fair to priorities. We think our loss will come after we have ordered material on priorities and it is delayed as we do not have a stock to fabricate from."

**Structural Steel Fabricator, Iowa:** "Man-hours in the plant have gained 50 per cent over last year."

**Tool Shop, Massachusetts:** "We accept defense orders only. Orders are beyond our greatly increased capacity."

**Gray Iron Founders, New York:** "It is particularly difficult for us to get high speed drills, reamers and fixtures for our machine department, which is operating largely on aircraft work. In buying No. 1 machinery scrap, we find that there is a great deal of stove plate in with it going at No. 1 prices. It is unfortunate that some regulation cannot control this deception."

**Coal Mining Equipment, Pennsylvania:** "There has been no percentage loss yet, but some inconvenience and rescheduling and much extra work and worry. To



## Give Opinions on Priorities

assist, our plant is working 50-hr. shifts."

**Pipe-Threading Machinery, Ohio:** "We have not had much trouble thus far although we are temporarily short of something or other."

**Gray Iron Castings, Pennsylvania:** "If we do not receive 100 tons of pig iron requested on form PD-69 for November delivery we will be compelled to close our plant."

**Printing Machinery, N. J.:** "Our plants cannot get rubber or copper sheets."

**Dairy Industry Equipment, New York:** "The situation is becoming grave. Although we have not yet been directly reduced in our production it is becoming more difficult every day to obtain steel and other materials and also machine tools."

**Machine Manufacturer, Pennsylvania:** "Production of regular products would have been sharply reduced by this time were it not for the fact that we entered the period of priorities restrictions with our usual substantial inventories of raw materials, mostly steel."

**Valve Manufacturer, Ohio:** "We are now short of brass in all forms."

**Metal Products, Ohio:** "Closing plant down black this week due to being unable to purchase pig copper."

**Tool Manufacturer:** "Our customers very often furnish the material."

**Jobbing Machine Shop, Illinois:** "We run a jobbing shop and are busy as usual. In the matter of priorities we let the customers carry that burden."

**Jobbing Foundry, Pennsylvania:** "For several months we were very much handicapped by lack of priorities but we are now getting adjusted to some extent."

**Screw Machines, New York:** "Priorities have slowed up shipments of machines sometimes when a few essential parts were lacking due to late incoming shipments, but no work-hours are lost for men are shifted temporarily to any productive job while waiting for materials."

**Heavy Machinery Builder, Ohio:** "A report such as this is not very conclusive. If we continue to manufacture on a 40 per cent basis we will soon have plenty of shortages. Have been able to get by

so far by strenuous efforts. We are planning to use more and more priority business and direct war orders to replace the business we will be unable to do much longer. We have actually lost business on account of priorities."

**Screw Machine Product Manufacturer, Ohio:** "Can't say production has declined but if skilled men were available we could do more."

**Plate Fabricator, Ohio:** "Defense work has kept us busy, but should that stop the shortage of materials (particularly steel) through priorities would greatly reduce our general business."

**Pipe-Gas Range Maker, Maryland:** "We expect a serious curtailment in about 30 days."

**Bottling Machinery Manufacturer, Pennsylvania:** "Production has not been reduced but expansion has been prevented (through priorities) and we are experiencing increasing difficulties in operating."

**Milk Plant Equipment Maker, New York:** "Our operations will decline shortly due to shortages of steel sheets, bars and plates, a lack of pipe fittings and of brass and copper."

**Machinery Parts Manufacturer, Ohio:** "Our company is expanding rapidly. A shortage of skilled men is retarding expansion."

**Nut and Bolt Plant, Ohio:** "If exclusively priority system continues, we expect adverse effect on our activity."

**Manufacturer of Rivets, Ohio:** "We could handle 50 per cent more business if we had steel."

**Heating Equipment, Ohio:** "We are working on Navy work, and have doubled our output since the defense program was initiated."

**Farm Implement Plant:** "The season is now nearly past for manufacturers of farm implements. Many orders have been received but we are unable to fill them because of our inability to obtain steel."

**Lighting Fixtures, Cal.:** "We have one or more defense jobs on the books now and so far our experience has been that taking all the red tape into consideration it has actually been more difficult for us to get the priority entitled to than it was to pick up the material in the open market."

**Railroad Car Plant, Ill.:** "To be perfectly frank, we don't know for sure whether we are classed as a defense industry or not."

**Foundry, Texas:** "The quality of our castings has suffered for lack of pig iron and shortage of strictly No. 1 cast scrap."

## Stainless Steel Cargo Planes to Be Built for S.A.

By WILLIAM PHAIR

• • • A large fleet of 100 per cent stainless steel cargo carrying airplanes for sale to South American republics is about ready to move from the drafting board to the production line, according to reports from Detroit and Washington. As the first move in this program, an order for about 1000 of these planes, the first all-stainless type to go into mass production any place in the world, will be awarded shortly to the Edward G. Budd Mfg. Co., Philadelphia, pioneers in the stainless fabricating field.

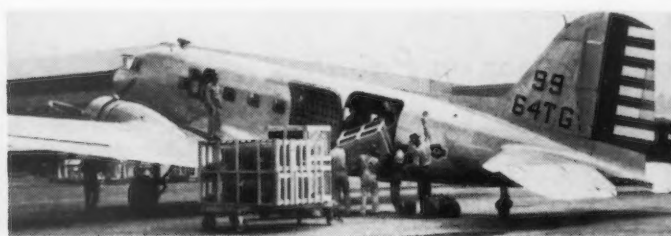
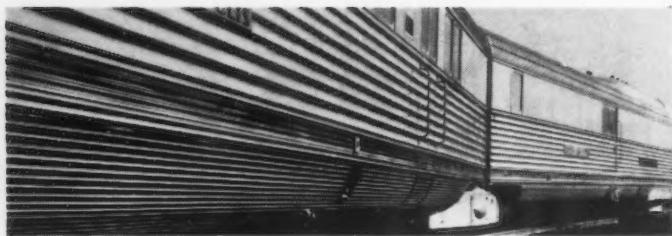
In addition to Budd, the Stout Skycraft Corp. of Detroit, backed by the Fisher brothers, will participate in the program by providing the design, and probably also building fuselages for the planes. Fleetwings, Inc., a division of Budd, will produce the wings. Also mentioned as possible producers of parts are the Murray Corp. of America and Freuhauf Trailer Co., both of which have facilities which might be fitted into the program.

Construction of these planes is understood to be part of the current Western Hemisphere defense effort and will serve to connect various Latin American countries and replace part of the commerce destroyed by the conversion of shipping for war use.

See "Assembly Line," *THE IRON AGE*, Oct. 30, page 62, for other details of a plan to build 10,000 stainless planes.

As most Latin American airports are extremely small and will not accommodate the high landing speeds of modern transport planes, a special design has been developed for the stainless planes, incorporating a low landing speed. The freight plane will have a cargo compartment 15 ft. in diameter and will be capable of carrying complete land vehicles in the compartment. Loading will be through the nose. A model of this new plane is understood to be undergoing tests at Langley Field, Va.

While these planes will be used primarily to counteract Axis efforts



**FROM TRAINS TO PLANES:** Edward G. Budd Mfg. Co., pioneers in the construction of stainless steel railroad cars will soon be devoting its facilities to building all-stainless freight-carrying airplanes. The new air freighters will probably look something like the Douglas transport shown here which is used by the Army to move military supplies.

in South America, it is pointed out that they will have important military significance as a means of rapidly moving troops and military equipment.

Of particular significance to the metal working industry is the decision to use stainless steel. Considerable study has been devoted to a stainless plane but thus far no design suitable for mass production has been developed, although the studies have indicated that stain-

less is well suited for use in large planes. A factor restraining the development of stainless planes has been the lack of comprehensive data on its physical properties. This deficiency, however, is fast being overcome. (See "Stainless Steel," THE IRON AGE, Oct. 9, p. 45.)

The all-out allocation of aluminum for aircraft programs already underway has ruled out the use of aluminum for the cargo planes. Plywood was also considered, but

discarded in favor of stainless. The Budd company's development of the Shotweld process of high production welding of stainless without deterioration of the metal will be employed to speed output of these planes.

Fleetwings, Inc., has built planes with a stainless frame and a fabric cover, while Budd has spot welded several all-stainless test wings for the Army which have been reported as completely satisfactory.

The new cargo planes will utilize stainless entirely in wing skin, fuselage and structural components. It has not been revealed what type engines will be used, but it is generally believed that Pratt & Whitney or Wright 1250 hp. radials will be used.

The cargo plane program will call for large quantities of stainless shapes and sheets from an already priorities-flooded industry and such supplies, according to present indications, will be obtainable only at the complete sacrifice of the few remaining civilian uses of stainless.

Indicative of this situation is the report that stainless producers in November will be permitted to ship only 10 per cent of their output to non-defense users. By December this will be cut to 5 per cent and by January all civilian uses will be completely eliminated.

Disclosure of the new plane program shed light on the action of H. LeRoy Whitney, chief of the alloys and specification division of OPM who has been criticized in recent weeks for permitting Budd to continue to use stainless for streamline railroad cars which have been on order for some time, while other stainless uses were being cut off. It is now known that Whitney permitted this in the knowledge that this new plane program was developing and wanted the Budd



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ALL SHAPES • ALL SIZES • ALL MATERIALS



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30 MAIN STREET      BROOKLYN, N.Y.

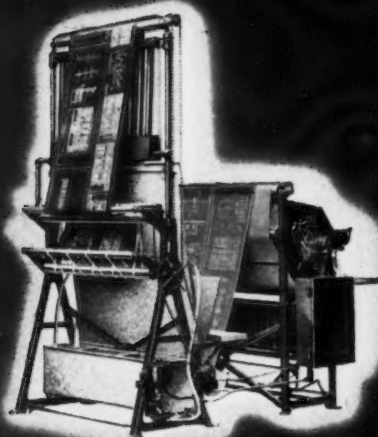





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PEASE CONTINUOUS BLUEPRINTING  
WASHING AND DRYING MACHINES GIVE  
YEARS OF UNINTERRUPTED SERVICE

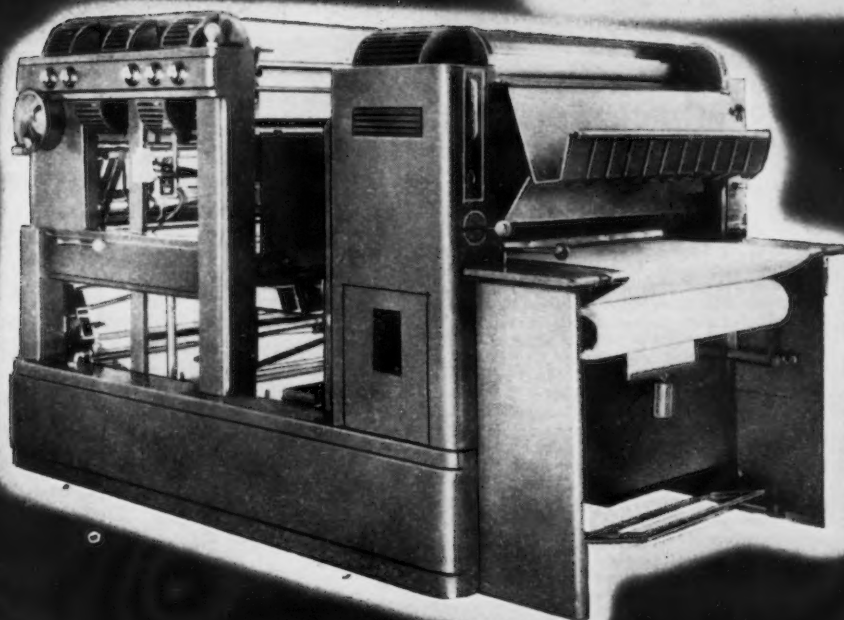


1910 . . . . . Pease Peerless Model "20,"  
first Continuous Blueprinting, Washing and Drying  
Machine . . . Speed 6 feet per minute; now obsolete.

The first Pease continuous blueprinting, washing and drying machine, using sliding "vacuum-like" contact, was sold in 1910. Now, more than thirty years later, many of these Peerless Model "20" machines are still giving faithful service.

Modern Pease blueprinting machines are built to give even longer service and, while many original exclusive features have been retained and refined, new ones have been added. Sliding "Vacuum-like" Contact now includes  $24\frac{3}{4}$ " of uninterrupted contact area and Trans-Peco glass which passes 20% more light . . . Actinic "No-Break" Arc Lamps burn for 45 minutes without the arc breaking, and then resume instantaneously . . . Three Speed Lamp Control (brand new and patented) allows the lamps to be operated at 10, 15 or 20 amperes, doing away with running speed and dryer heat changes . . . Horizontal Water Wash floats the exposed paper free from tension thus preventing wrinkles, stained prints and bleeding . . . Quick Change Chemical Applicator System allows change over from blueprints to negatives and vice versa in 30 seconds, and provides the only method of applying potash to one side and hypo to both sides of paper (no yellow stains) . . . Aluminum Drying Drums (five of 8" diameter each in Model "22-16" illustrated) thermostatically controlled, heated by gas or electricity, allow gradual drying, automatically, without distortion, resulting in prints "flat as hung wallpaper."

THE C. F. PEASE COMPANY  
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1941 . . . . .  
Pease Model "22-16,"  
latest streamlined Continuous Blueprinting,  
Washing and Drying Machine . . . Speed 20 feet  
per minute: the machine  
of the future. (Model  
"22," not illustrated, has  
a speed in excess of 28  
feet per minute.)

## Pease Blueprinting Machines

A TYPE AND SIZE FOR EVERY REQUIREMENT INCLUDING DIRECT PROCESS PRINTING

company to maintain its stainless fabricating equipment and personnel in first class condition so that the company could swing over into plane production with as little loss of time as possible.

This explanation of the Whitney order was confirmed in principal by F. S. White of the Budd company who indicated to THE IRON AGE that this was also his company's understanding of the situation.

Financing arrangements of the

program have not been revealed, but it is believed probable that the Export-Import bank, either directly or through a new subsidiary, will arrange for the purchase or operation of the planes by the Latin American republics.

Development of the cargo plane program is attributed to a committee which has been working for some time with Jesse Jones. This committee consists of William B. Stout, president of Stout Sky Craft

Corp., Reed Chambers of Aviation Underwriters, Inc., Andre Priester of Pan-American Airways, and Eric Nelson, who is understood to be Jones' representative.

## Closer Ties in Plane Making Seen

Hollywood, Cal.

••• New records for quality production and cost in airplane manufacture for national defense will result from a closer alignment of production and engineering departments in aircraft factories, said Donald U. Kudlich of the Wright Aeronautical Corp., Paterson, N. J., before 1000 members of three-day national aircraft production meeting of SAE, the largest SAE Pacific Coast meeting ever held. Sessions began Oct. 30.

"By virtue of training and experience, the objectives of engineering and production personnel are widely separated," Mr. Kudlich declared. "The engineer is concerned with design and performance, and the production man with fabrication of material at the lowest cost.

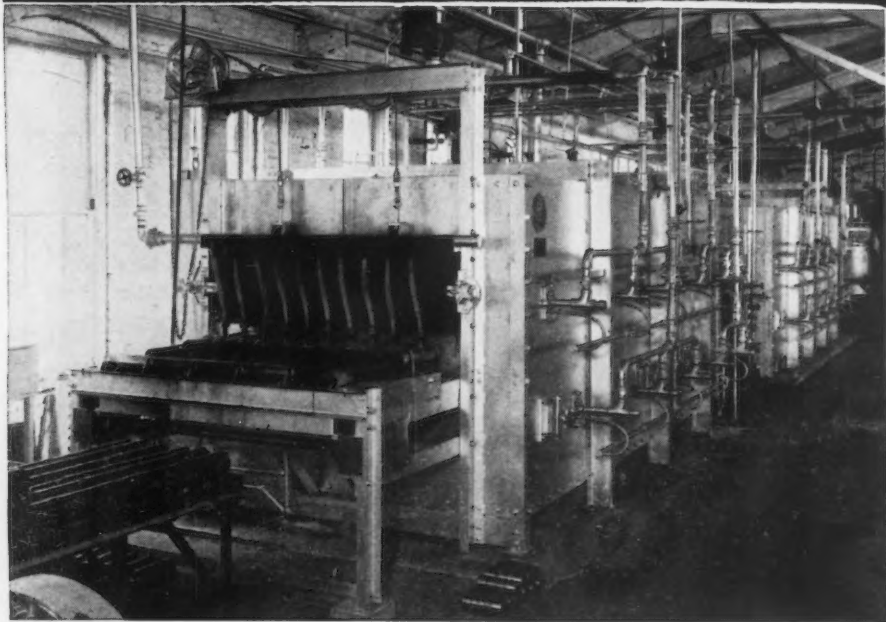
"To meet the ever increasing needs of national defense, a better understanding of the problems involving the two groups and their whole-hearted cooperation are essential."

Blitzkreig and how to stop it was the address theme of A. T. Colwell, Thompson Products, Inc., Cleveland, and president of SAE. He said, "It is essential to tie the use of aircraft with armored divisions. Authorities agree that without control of the air, in the future there will be no success either on land or sea. The panzer division was so effective because of complete air control. Contrary to popular belief it contains all arms.

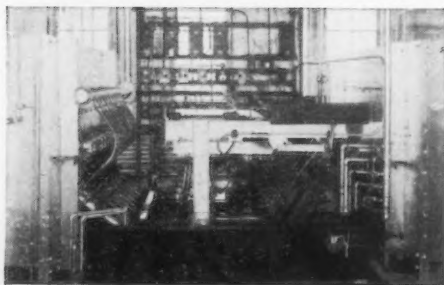
"The panzer division was not used against strong defense," he declared. "In meeting or preparing a defense against the panzer, it is universally agreed that more and stronger divisions are the answer, together with air control. That is the reason that we have such a large program in planes and tanks, because we plan to have more and better equipment than any enemy against which it might be used. Our present plane and tank designs are the finest to be

## EF FURNACES

For Every Industrial Heat Treating Process



## This Completely Automatic EF Furnace Equipment Heat Treats Shells---Scale-Free



Continuous automatic quenching equipment. The shells are quenched without coming in contact with air, automatically reversed and charged into the tempering furnace at right.

The shell forgings are pushed thru the hardening and tempering furnaces in parallel rows, in protective atmosphere-filled conveying tubes. An automatic quenching equipment (shown at left) is located between the furnaces. The shells are quenched without coming in contact with air, automatically reversed and charged into the tempering furnace. This installation is gas-fired and is equipped with ten conveying tubes. A similar installation with 15 conveying tubes has also just been completed.

This is one of a number of installations we have made for the production heat treatment of shells and other defense products including machine gun clips, cartridge cases, aircraft and tank parts, gun and ammunition components, etc.

Send for printed matter showing this and other interesting installations. Submit your furnace problems to EF Engineers.

## The Electric Furnace Co., Salem, Ohio

Gas Fired, Oil Fired and Electric Furnaces---For Any Process, Product or Production



... These are reasons why  
**Porter Fireless Locomotives**  
 can cut your switching costs  
 as much as ... **50%**



● **LOW INITIAL COST**

A Porter Fireless does not require diesel, electric or other motors. There is nothing to make initial cost high.

● **LOW OPERATING COST**

A Porter Fireless uses low cost steam, produced in stationary boilers, for fuel. Charging can be done during idle periods. No night or week-end attendance necessary.

● **LONG LIFE**

The first Porter Fireless was placed in operation in 1914, and is still working efficiently.

● **LOW MAINTENANCE COST**

Fewer working parts mean fewer repairs. No boiler or firebox. Reservoir never needs replacement.

● **SAFE**—No fire hazard.

● **CLEAN**—No fumes or dirt.

● **QUIET**—Soft exhaust is only noise.



If you have steam available in your plant, then a Porter Fireless can save you up to 50% in haulage and switching costs.

But a saving of money is just one advantage. You want dependability ... you want one man operation ... you want availability of 99% ... and you get them all in a Porter Fireless. Built in direct or geared drive types in sizes from 10 to 100 tons. Write for complete information.

ONLY PORTER BUILDS A COMPLETE LINE OF LOCOMOTIVES FOR INDUSTRY

**H. K. PORTER COMPANY, INC.**

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NEW YORK

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found in any armed force. Our motors are the most dependable and they will all soon be in quantity production."

William B. Stout, president of Stout Engineering Laboratories, Dearborn, said, "Fundamental progress from now on is not based on military progress, but on research. Research is the foundation of our new civilization. The world is now in its second great

transporation change. After 1000 years of civilization at a horse pace we stepped up to the automobile pace, from 5 m.p.h. to 50. Now with the airplane we will step it up to 300. While the horse covered cities, and the automobile covered the whole nation, the airplane will cover the whole world, for commerce and travel, and do it not only faster, but safer and cheaper.

## New "Flying Wing" May Revolutionize Airplane Design

Los Angeles

• • • American aeronautical engineering and research scored another victory last week with the new Northrop "Flying Wing," a radically different design of tailless aircraft that "points the way to a new family of airplanes in the near future."

After nearly 20 yrs. study of the project by John K. Northrop, president of Northrop Aircraft, Inc., the "flying mockup," as the craft has been tagged, was designed and constructed at the Northrop plant, Hawthorne, Calif. The plane is the first successful, true "flying wing," having no tail or auxiliary surfaces or no fuselage, and housing completely within the contours of the airfoil, the powerplant, personnel, and load. A novel configuration of the wing tip is employed, the tips dropping downward in a direction opposite to the normal dihedral of a conventional wing, and providing control and stability of the plane without use of external fins or rudders.

The "flying mockup," which has undergone more than 200 test flights over a period of 18 months has a 38-ft. wingspan and is powered by two 120-hp. air-cooled, horizontally opposed engines. The engines are on either side of the pilot, driving pusher propellers through 10-ft. extension shafts

*A photograph of the "Flying Wing" appeared in last week's IRON AGE, page 77.*

that connect the blades to the engines. The drive shaft housings that extend above and to the rear of the wing are the only parts of the airplane that do not directly contribute to the lift of the airfoil.

In view of the results of tests to date, transport planes of the "flying wing" design would require considerably less power to attain comparative speeds and could achieve cruising speeds 100 m.p.h. greater than the best

# SHELLS

## *a-poppin'*



A 90 mm. shell forging from a machine every 12 seconds with the help of "dag" colloidal graphite is a recent report. ♦ ♦ A new shell forging lubricant containing "dag" colloidal graphite is now available nationally from major oil companies. ♦ ♦ Write for Technical Bulletin No. 230 Q entitled "Colloidal Graphite Dispersions."

"dag" is a registered trade-mark of the Acheson Colloids Corporation

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PORT HURON MICHIGAN







# A *Phantom Gear*

## IN EVERY MONARCH LATHE

**P**RODUCTION BATTLES, in wartime or peacetime, are not won by factories or machines, alone. They're won by morale, by the courage and spirit and willingness of workers and management to put their heads and their hearts, as well as their hands, to this job of getting things done.

That spirit has always prevailed, here at Monarch. Being machine-minded, we express it in a production phrase, "*The Phantom Gear*." Naturally, you won't see it in a Monarch lathe. But you'll *feel* its driving power, from improved design to critical inspection

of every lathe we build . . . one every working hour.

This force which we call "*The Phantom Gear*" has been the inner urge of Monarch for more than 30 years. It stimulated our many pioneering improvements which have so broadened the scope of lathe work. Its power will continue as long as there's a Monarch—helping the thousands of owners and operators of Monarch lathes produce more goods for more people, at lower cost—and in emergencies, working for the defense of our Nation. The Monarch Machine Tool Company, Sidney, Ohio.

**MONARCH**



**LATHES**

COVER THE TURNING FIELD

transport ships now obtainable. Such transport planes can be built as soon as the necessary engineering can be completed and construction facilities made available. As Northrop Aircraft, Inc., is now engaged in the construction of military planes, it will be impossible to apply the Northrop wing to commercial transport for some time to come.

### P-3 and P-4 Re-extended; Civilian Aviators Aided

Washington

• • • Manufacturers of airframes, and aviation engines and propellers, who have been operating with the assistance of Preference Rating Orders P-3 and P-4 will continue to receive the same aid during November and December.

The two orders, assigning preference rating A-1-c to engine and propeller manufacturers, and A-1-d to airframe makers, were issued on April 29, 1941. They were extended for the month of October and now have been re-extended until the end of the year.

At the same time the Priorities Division announced an amendment to Supplementary Order P-6-a giving an A-10 preference rating for deliveries of necessary parts and accessories for all registered and certificated civilian-operated airplanes.

### Aircraft Minimum Wages Extended to Parts Making

Washington

• • • The Labor Department's December, 1938, order fixing a minimum wage of 50 cents an hour, or \$20 a week, in the aircraft manufacturing industry has been broadened to include manufacturing and finishing of spare parts and accessories, according to an order issued Oct. 18 under the Walsh-Healey Public Contracts Act. The order is effective Nov. 18. The deadline for filing objections to the proposal passed on Nov. 18, 1940, without any protests being received from the industry.

### Power Conservation in Southeast Area Ordered

Washington

• • • The OPM last Thursday announced a rigid power conservation program that is designed to assure full and uninterrupted operation of defense plants in the Southeast. The program calls for:

1. Curtailment of power by large commercial and industrial users in seven states. This becomes effective Nov. 10, unless heavy rains between now and then should end the shortage. Vital defense industries and a few others providing essential civilian services are exempt.

2. Immediate discontinuance of the use of power for such non-essential services as sign lighting, show-window lighting, and flood lighting of athletic fields.

3. Immediate mandatory pooling of power by inter-connected systems of 40 publicly and privately owned companies in 13 states.

## DINGS MAGNETIC DRUMS

to remove iron  
from foundry sand...  
no conveyor belt necessary

**DINGS** High Intensity Magnetic Drums are designed to remove iron from foundry sand when it is impractical to carry it on a conveyor belt and pass it over a magnetic pulley. These separators, consisting of powerful magnetic coils surrounded by a revolving tubular shell meet all demands for an economical stationary installation with sufficient capacity to handle large quantities of sand per hour, and enough power to extract all the iron.

A large automotive foundry recently installed three Dings Magnetic Drums with outstanding success after finding that pulleys or pulley type separators would be impractical for the following reasons: hot sand would make belting costs excessive; their handling setup includes an apron conveyor which they did not wish to remove as would otherwise have been necessary.

The drums installed in this plant are removing everything from fine shot up to 6" chunks of iron. The drum coils are wound with glass wire to resist heat and for strength and the shells are made of stainless steel to resist abrasive action of the sand.

What conditions must be met by a separator in your plant? Write to Dings today for complete details on the unit that will meet your individual needs.

**DINGS MAGNETIC SEPARATOR CO.**  
516 E. Smith St.  
Milwaukee, Wis.

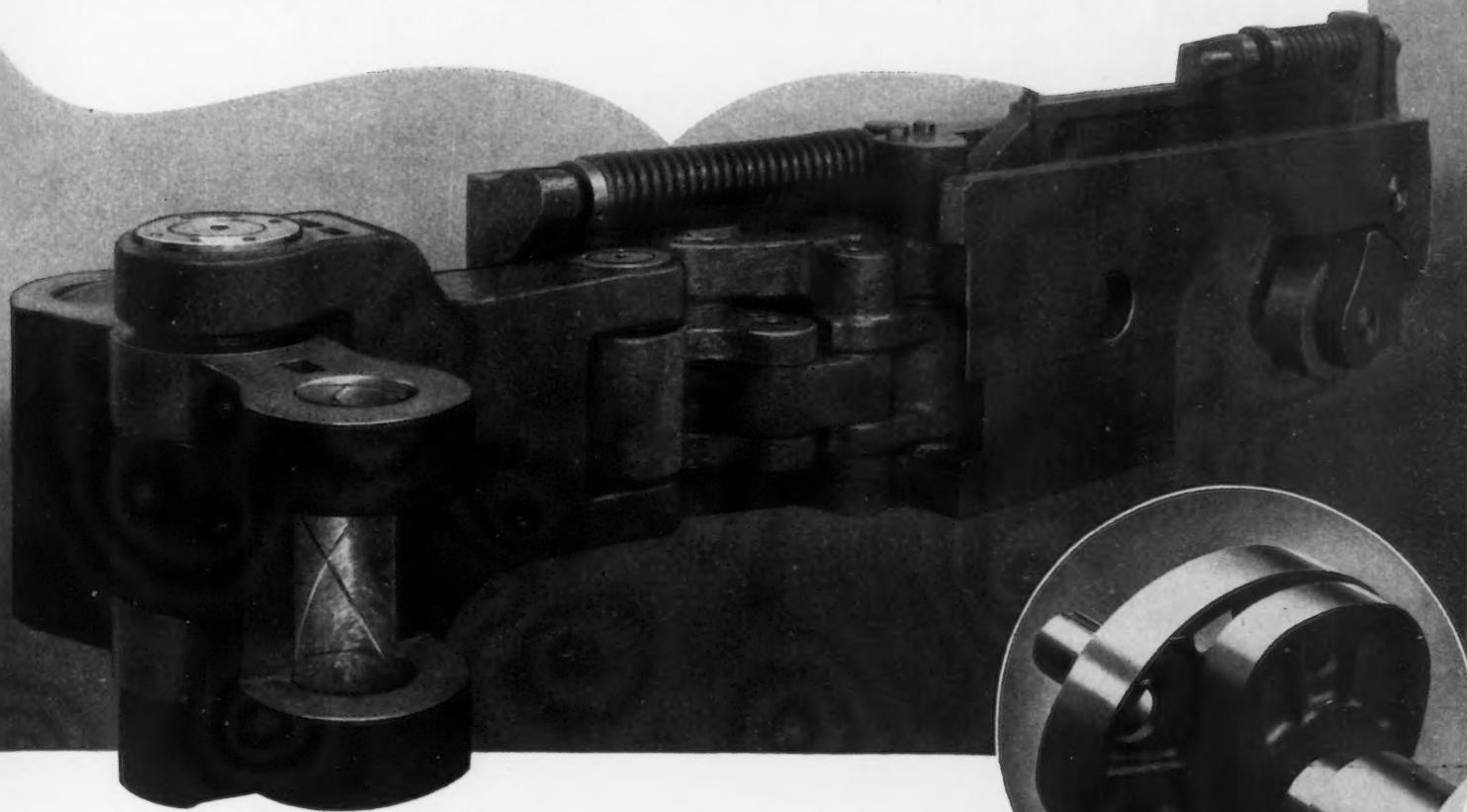
Complete line of magnetic separators for removing iron from sand, slag, refuse and for separating ferrous and non-ferrous scrap. High Intensity Lifting Magnets for economical metal handling.

**Dings**  
MAGNETIC  
SEPARATION

Illustrating the principle of operation of the Magnetic Drum. Sand passes over drum in normal trajectory while iron is attracted and held to revolving shell until it passes underneath and out of magnetic field where it is discharged.



# **AJAX** CAM ACTUATED DIE GRIP WITH *Self Contained Automatic Safety* **PROVIDES SUSTAINED GRIPPING POWER ESSENTIAL TO CLOSE TOLERANCE FORGING**



**T**HE exceptional die grip power of Ajax Forging Machines is a prime factor in establishing the close concentricity and diameter tolerances on high production forging of which Ajax machines are capable.

The grip mechanism is driven from the crankshaft by a ruggedly proportioned complementary cam which works through a single heavy toggle to close the dies with tremendous power, and clamp them rigid with constant pressure during the forging cycle.

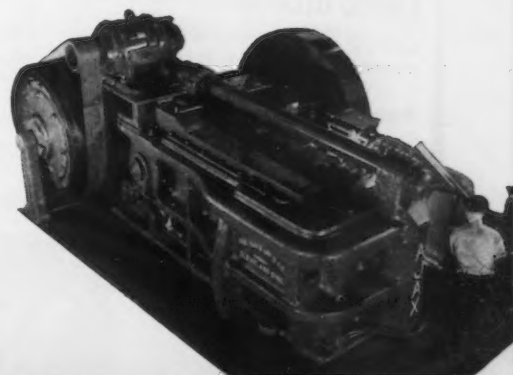
The cam is taper fitted on the shaft, and its wide treads are heat treated to high hardness, as are also the forged cam rollers mounted on anti-friction bearings in the cam slide.

The ruggedly constructed, high toggles with large diameter middle-supported pins, having full bearing on the pressure side, provide solid, uniform backing to the gripper dies throughout their entire height and hold them tightly together against severest spreading action. Shearing-off, punching, swaging, slitting and actual forging operations can be performed between the dies, impossible with less powerful grip.

The self-contained and fully automatic safety housed within the cam slide completely protects the machine from damage due to misplaced, over-sized or under-heated stock, or other obstructions to closing the dies. Its automatic re-set eliminates production delays.

Powerful die grip, self-contained automatic safety, accessibility of cam slide, rugged high main toggles are some of the features of Ajax Forging Machines which merit their purchase, merely on a basis of mechanical soundness. Write for Bulletin No. 65-B.

**BUY FORGING EQUIPMENT  
ON THE BASIS OF  
MECHANICAL SOUNDNESS**



**THE AJAX MANUFACTURING COMPANY**  
EUCLID BRANCH P. O. CLEVELAND, OHIO  
621 MARQUETTE BUILDING • CHICAGO, ILLINOIS

## Tank Redesigning Finally Confirmed

Detroit

• • • An Army revelation that the M-3 medium tank has been redesigned—made public by Maj. Gen. Jacob L. Devers, commanding general of the armored force, at recent metal Congress—confirm reports which have been prevalent

in Detroit for some time. These reports, while rather widely disseminated, received no publicity because an air of secrecy surrounded the redesign and it was indicated that the information was more or less a military secret.

However, Gen. Devers revealed that the new medium tank, to be known as the M-4, would have its 75 mm. cannon mounted on top in a turret with a full 360-degree swing. It is known here that the

former design, in which the 75 mm. gun was below a 37 mm. gun and could be swung through only a limited arc, was regarded as something of a faux pas in design.

The improved design is ready to go into production now, it is understood, and will require some slight modifications in tooling in the Chrysler tank arsenal where the M-3 already is in production. It is understood that Ford and General Motors production plans call for the M-4 tank.

Other features of the design have been criticized, including the use of an aircraft type engine



### BOTH AMPCO-EQUIPPED!

Sleek, 400-mile-an-hour fighting planes and ponderous earth-moving equipment, both are equipped with AMPCO METAL, that sturdy alloy of the aluminum bronze class. Different types of applications, of course, but each dependent upon Ampco bronzes for protection against wear, impact, fatigue and other types of metal failure. Airplanes and power shovels are only two of the many diverse kinds of equipment regularly employing AMPCO. The range of uses of Ampco bronzes extends through all industry. The wear-resistant qualities and high physical properties of the metal are recognized by performance-conscious engineers in key defense activities.

This versatile bronze has proven itself in machine tools, ordnance, aircraft, heavy machinery—wherever a bronze that can "take it" is needed. Investigate its use, when you have a metal problem. It is available in six grades of hardness and physical properties. Ask for Catalogue No. 22, or specialized literature.

#### AMPCO METAL, INC.

Department IR-116

Milwaukee, Wis.

#### AMPCO LITERATURE Available

AMPCO METAL, catalogue 22  
Ampcoloy—Industrial Bronzes  
Catalogue  
Ampco-Trode Coated Aluminum  
Bronze Welding Rod  
Ampco Metal in Machine Tools  
Ampco Metal in Bushings and  
Bearings  
Ampco Metal in Dies  
Ampco Metal in Acid-Resistant  
Service  
Ampco Metal in Aircraft  
Ampco Metal Centrifugal  
Castings  
Ampco Metal in Heavy  
Machinery  
Ampco Metal in Gears

# AMPCO METAL

The Metal Without An Equal

### "Bomb Screen" Offered To Protect Crucible

Pittsburgh

• • • Allegheny County officials here have offered to erect a 250-ft. "bomb screen" on a bridge in Pittsburgh above the boiler room of one of the Crucible Steel Co. of America plants. Considered vulnerable in case of sabotage the steel company asked for and received a 24-hr. guard for the plant from the county. The screen, which would release the guards, will be built providing the steel company furnishes the material.

which was not originally designed for such high horsepower or rough usage, and the fact that air for cooling must be drawn in from the outside so little protection can be afforded against flame attack, or gas. Rumors from the recent war games also attribute important difficulties, even fatal accidents and drownings, to instances where members of tank crews were unable to extricate themselves from the crew compartment when a few of the tanks struck extremely bad going in the swamp areas.

### Ajax Metal Co. Publishes Bi-Monthly House Organ

Philadelphia

• • • A new publication *Metelectric Progress*, will appear bi-monthly following its first issue of Oct. 1, published by the Ajax Metal Co., and divisions, Philadelphia, Dr. G. H. Clamer, president, announced. The publication will be edited by Howard Linn Edsall, former newspaperman.



HERE AMERICA'S HUGE DEFENSE INGOTS ARE FORGED

## BOLTS AND NUTS MUST NOT FAIL!

At left: Mesta 6000 ton pure hydraulic quick-acting forging press shown forging bright-hot ingots.

Inset: Shows bright-hot ingot 100" dia. being fed onto the platens of this monster Mesta Forging Press.

UNHEARD of national defense demands on American industry make it necessary to work on projects of vast dimensions, involving terrific shocks and strains.

This 6000 ton quick-acting Mesta Hydraulic Press is forging bright-hot ingots, 100" in diameter, for vital items in our national defense. No matter how sudden the shock, the bolts and nuts that help hold this gigantic forging monster in line must not strip, fracture, give way. They must hold tight to meet our emergency needs.

RB&W bolts and nuts have been purchased for many years by Mesta Machine Co. for use in their heavy industrial equipment. Throughout all industries wherever precision, and strength must predominate, EMPIRE bolts and nuts are known and used.

Since 1845 RB&W has pioneered in producing threaded fastenings of the highest quality, and today with demands constantly increasing to meet emergency production needs, RB&W has increased facilities and speeded production to render the same service for which this Company has been famous for nearly a century.

*(This is one of a series of advertisements devoted to products essential to national defense.)*

*Ships for defense!*

*Tanks for defense!*

*Bolts and nuts for defense!*

### WHICH COMES FIRST?

Probably there is no single item made by American industry more generally used in all defense products than bolts and nuts, rivets and other industrial threaded fastenings. A billion dollars worth of castings, forgings, stampings, engine parts, can be of no use to the defense program unless there is available a necessary supply of such fastenings.

It is our problem to produce these vital products in record-breaking tonnage, so that no interruption may occur in the assembly of that vast array of materials required for the Arsenal of Defense.

To that task we direct the full energies of the entire RB&W organization in our three strategically located plants.



**RUSSELL, BURDSALL & WARD**  
BOLT AND NUT COMPANY

PORT CHESTER, N. Y.

ROCK FALLS, ILL.

CORAOPLIS, PA.

**BOLTS:** Carriage - Machine - Lag - Plow - Stove - Elevator - Step - Tap - Wheel & Rim - Battery - U-Bolts - Tire - Automotive - Drilled - Faced - Special Heat Treated, etc. - **NUTS:** Cold Punched - Semi-Finished - Hot Pressed - Case Hardened - Slotted - Castle - Machine Screw - Marsden Lock - Low Sulphur - **RIVETS:** Standard - Tinners' - Coopers' - Culvert - Clevis and Hinge Pins - **SCREWS:** Cap - Machine - Hanger - Sheet Metal - Phillips Recessed Head - **WASHERS:** Plate - Burrs - **MATERIALS:** Steels - Alloys - Brass - Bronze - Naval Brass - Everdur - Herculoy - and others - **RODS:** Stove - Seat - Ladder - **PLATED PARTS:** Cadmium - Zinc - Chromium - Nickel - Hot Galvanized - Copper - Tin - **SPECIAL UPSET & PUNCHED PRODUCTS.**

## ALLOCATIONS

### *Will Not Increase Scrap Supply Without Your Help*

● The Office of Production Management has decided that priorities and allocations of iron and steel scrap are necessary to prevent curtailment of steel production at any mill.

● But the iron and steel industry knows that this process, while perhaps alleviating individual shortages, will not increase the overall supply of scrap.

● The fact that allocations are being resorted to demonstrates the extreme importance of further measures to add to the total movement of scrap.

● We continue to urge that every user of steel give serious thought to the possibility of collecting more scrap in his own plant.

● This is one of the important contributions every steel user can make to National Defense. More scrap will help to make more steel and relieve shortages.

### *The* **CHARLES DREIFUS** *Company*

*(Broker in Iron and Steel Scrap for 40 years)*

Philadelphia, Pa.	Pittsburgh, Pa.
Widener Bldg.	Oliver Bldg.
Rittenhouse 7750	Atlantic 1856

Worcester, Mass.  
Park Bldg.  
Worcester 6-2535

## NEWS OF INDUSTRY

### Loss of Jobs Looms at Milwaukee in Shortages

*Milwaukee*

• • • Difficulty in securing material is causing a serious situation in local manufacturing circles, particularly among the smaller factories. Union officials have complained to city officials that some 100 workers in 26 of the smaller plants here and that between 500 and 600 more employees are threatened with loss of jobs because of complete shutdowns.

Pressed Steel Tank Co. resumed operations with some 500 workers after closing several days due to shortage of steel.

One big Milwaukee concern reported it was having more trouble getting a \$2.50 replacement part of its machinery than in getting \$2,000,000 worth of material for defense production.

### Iron Ore Affected by New Export Restriction

*Washington*

• • • Iron ore uranium and industrial diamonds are among products that cannot be exported until an affidavit is filed with the Economic Defense Board showing the specific use for which they are intended. This restriction on exports has been incorporated in administrative order No. 2, issued last week, which also specifies that past shipments since Jan. 1, 1937, must be shown. Affidavits of specific use must be filed regardless of whether an export license has been obtained in the past or the shipper is applying for a new license. Before a shipment will be authorized, a finding will be made as to whether or not denial of the proposed exportation would work an unusual hardship.

### New Book Covers Machine Shop Practice

*Detroit*

• • • A new book "Machine Shop Theory and Practice" co-authored by Albert M. Wagener and Harlan R. Arthur, the former a classroom instructor in the Henry Ford Trades School and the latter principal of both the Ford Apprentice School and the Ford Engineering School is being released from the press of D. Van Nostrand Co., Inc., New York.



Greater Tonnage  
Per Edge of Blade



**AMERICAN  
SHEAR KNIFE CO.**  
HOMESTEAD · PENNSYLVANIA



## **\$100,000 Loss on Order for Bombs**

*Buffalo*

••• One manufacturing concern here has lost \$100,000 to date on an experimental order for cast steel bombs, and can't get more contracts to offset the loss.

## **Lukens Grants Pay Raise: Pays 1% on First Mortgage**

*Coatesville, Pa.*

••• Lukens Steel Co. granted a pay raise of 10c. per hr., raising the base hourly rate from 56½c. to 66½c. The raise, effective Oct. 26, was made after C.I.O. union demands placed upon the company threatened a strike.

The payment of additional interest of 1 per cent on the first mortgage 5 per cent bonds of 1955 of Lukens Steel Co. was announced this week. Funds for the payment of the interest, payable on Nov. 1, are on deposit at the Bankers Trust Co., New York.

## **Historic Drawings Given to Chambersburg**

••• The Institution of Mechanical Engineers, London, has presented to Chambersburg Engineering Co., Chambersburg, Pa., makers of forging hammers, presses, etc., the original wash drawing of Nasmyth's patent steam hammer dated Jan. 4, 1844, as well as two other wash drawings of Nasmyth machinery.

Made before the days of photography and the air brush, these drawings have the smoothness and detail in highlighting and shading of a modern air-brushed drawing or retouched photograph.

## **Rockford Plant Expands For Shell Parts Making**

*Rockford, Ill.*

••• George D. Roper Corp. will build a \$600,000 plant addition to accommodate the production of 75 mm. armor piercing components. This is the third major industrial expansion move in the Rockford area to provide additional defense facilities.



# **HOLD THAT HEAT**

**WITH CAREY HI-TEMP  
INSULATIONS**

*For High Temperature Surfaces  
1000°F. to 2500°F.*

CAREY Hi-Temp Insulations were developed specifically for insulation of boilers, tanks, towers, breechings and other surfaces where temperatures range as high as 2500°F.

These special compounds of heat resisting materials are the TOP in insulating efficiency, high in impact strength, low in heat shrinkage—have the qualities to resist the decomposing effects of long exposure to extreme temperature.

Correctly applied in the proper thicknesses, CAREY Hi-Temp Insulations insure the lowest possible heat loss—the highest possible fuel savings.

Let CAREY engineers check your equipment for avoidable heat losses, or make recommendations for new equipment. No cost or obligation. Write for Insulation Catalog, Department 26.

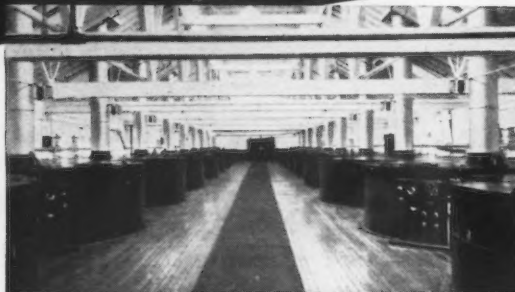
THE PHILIP CAREY MANUFACTURING COMPANY • Lockland, Cincinnati, Ohio  
Dependable Products Since 1870  
IN CANADA: THE PHILIP CAREY COMPANY LTD. Office and Factory, LENOXVILLE, P. Q.

# INGACLAD

## STAINLESS-CLAD STEEL

has a record of  
**10 YEARS**  
in continuous service

That's worth considering when you order Stainless-Clad material.



### Get the Extra Protection that comes from EXPERIENCE!

IngAclad Stainless-Clad Steel gives you two important assurances:

- 1st. The exclusive Ingersoll Process which inseparably bonds the two metals, and
- 2nd. IngAclad is backed by a record of 10 years in continuous satisfactory service.

Write for Special IngAclad Booklet, and complete Manual of Welding and Fabricating Procedures.

**INGERSOLL STEEL & DISC DIVISION**  
**BORG-WARNER CORPORATION**  
310 South Michigan Avenue Chicago, Illinois  
Plants: Chicago, Ill.; New Castle, Ind.; Kalamazoo, Mich.



In 1934, this Adsorber was fabricated for the Columbus Coated Fabrics Co., Columbus, Ohio. Four similar installations have since been made.



Unretouched photo of machine-cutting. Note the inseparable bond formed between the mild steel and the cladding of stainless steel.

*"Borg-Warner Product"*

Ten years ago, a leading manufacturer of soaps had this battery of kettles lined with IngAclad. They are in service today, along with many other installations of IngAclad equipment.

1

The same amount of Solid Stainless when used in the form of IngAclad makes 5 Sheets or Plates of the same size and gauge, each using only 1/5 as much chrome and nickel.

5

### Users of INGACLAD include:

American Cyanamid Co.  
R. D. Cole Mfg. Co.,  
Newnan, Ga.  
Dow Chemical Co.  
E. I. DuPont de Nemours Co.  
Greenville Steel & Foundry Co., Greenville, So. Car.  
Holliston Mills,  
Kingsport, Tenn.  
Leader Iron Works,  
Decatur, Ill.  
Monsanto Chemical Co.  
Sayles Finishing Plants, Inc.  
Sheet Metal Engineering Co., Chicago.  
Southern Bleachery & Print Works, Taylors, So. Car.  
Stevens Metal Products Co., Niles, Ohio.

TO CONSERVE VITAL ALLOYS USE  
**INGACLAD**  
STAINLESS-CLAD STEEL

### New Milwaukee Plant To Be Set for Blackout

*Milwaukee*

••• Ground is being cleared for the new \$9,066,000 supercharger plant of the Allis-Chalmers Mfg. Co. Its completion in about six months will give Milwaukee its first real blackout factory.

It will be a 500 x 800 ft. single floor building in suburban Greenfield township. When completed a force of approximately 3000 men and women, to be recruited mostly from Milwaukee's labor supply, will man the streamlined, windowless plant on night and day shifts.

Large test rooms will be provided. Other facilities will include a fully equipped laboratory for research and testing of raw materials. Only the 50 x 200 ft. area devoted to offices and rest rooms will have windows. Fluorescent lighting will be provided for the entire area given to production. Additional protection is afforded by location of vital power lines underground, the electrical substation to be completely enclosed.

Adjacent to the main building will be a forge plant, 80 x 200 ft. as well as a terminal building already constructed. In all respects, except supervisory, the new Allis-Chalmers unit will be independent of the operations of its parent plant nearby, now engaged in producing nearly \$100,000,000 in defense materials.

### Auto-Railer Production Will Be Expanded

*Detroit*

••• An expansion of operations of Auto-Railer Division of Evans Products Corp. has been announced by Col. E. S. Evans, president. The expansion will take the form of a new production of these combination road-rail vehicles at Highland, Ill., by the Hugg Co. The Detroit plant of Evans Products Corp. will supply engines, transmissions, flanged wheels and hydraulic and air equipment for assembly by the Hugg Co.

Carl Gross is manager of the Auto-Railer Division of Evans, which is supplying technical and supervisory personnel to the plant at Highland. Sales and management functions remain intact in Detroit. About 60 Auto-Railers are in service now.





Photo by Harris & Ewing.

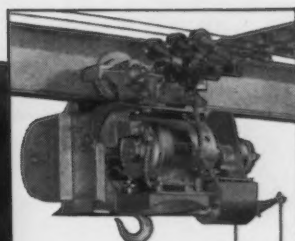
**IDLE PLANT CHAMPION:** Floyd B. Odum (above), director of the OPM's Contract Distribution Division, revealed that he has certified seven midwest communities for special consideration in award of defense contracts because they face unemployment due to application of priorities.

### Illinois Ordnance Plant Rises on 2000-Acre Site

Marion, Ill.

•••Two thousand acres of land here are now covered with structures rising for the Illinois Ordnance Plant which was dedicated late last month. About 30 warehouses are under construction and work has started on the "igloos" to house high explosives at the rate of 15 per week. Also under construction are 70 miles of new roads and 70 miles of railroad tracks.

# THEY BEGGED FOR MACHINE PARTS ...and got 'em!



With a twist of the wrist, huge steel bars are set speedily and gently on the cutting table with an R & M hoist at the South Bend Welding and Boiler Repair plant. This is the famous R & M Model S-1 hoist of 2000-lbs. lifting capacity, with rope control, and trolley built to fit monorail crane.

"Give us machine bases, jigs and fixtures . . . faster," pleaded manufacturers. But the South Bend Welding and Boiler Repair plant, straining day and night, was "bogged down."

An R & M engineer soon spotted the trouble. Material and finished products were moving too slowly . . . taking the time of two men tussling with an old-type chain hoist.

He recommended installing an S-1 Type R & M 2000-lb. hoist with monorail trolley. It worked a miracle.

Now South Bend Welding and Boiler Repair is meeting orders on schedule. Handling time of steel and finished products has been stepped up 70 per cent. One man moves tons with a twist of the wrist. The hoist paid for itself within a few months . . . is working

12 to 14 hours a day, piling up savings every hour.

In large or small plants, wherever material moves, R & M hoists can help speed *your* manufacturing schedule—at *big savings*. Two thousand standard hoist and crane models provide as many answers as there are problems. Contact your nearest R & M hoist and crane division office and "take it up" with R & M—today.

Save headroom, time and money with R & M's new "ceiling hugger"—the R & M Type F-1/2 all-steel hoist. Write today for Bulletin No. 800, giving complete details and specifications.



#### R & M HOIST & CRANE DIVISION OFFICES:

Atlanta.....319 Walton Bldg.	Cleveland...352 Rockefeller Bldg.	New York.....200 Varick St.
Baltimore,Lombard & Concord St.	Dallas.....1100 Cadiz St.	Philadelphia...401 N. Broad St.
Boston.....55 Long Wharf	Denver.....1420 16th St.	Pittsburgh....H. W. Oliver Bldg.
Buffalo....2005 Delaware Ave.	Detroit....2921 E. Grand Blvd.	Providence....44-46 Clifford St.
Chicago....2400 W. Madison St.	Houston...3715 Harrisburg Blvd.	San Francisco..237 Rialto Bldg.
Cincinnati...418 New St.	Newark.....700 Bergen St.	Seattle.....216-17 Walker Bldg.
Syracuse...204 State Tower Bldg.	Montreal...Lyman Tube & Supply Co., Ltd.	

**ROBBINS & MYERS • Inc.**

HOIST & CRANE DIVISION • SPRINGFIELD, OHIO

MOTORS • FANS • MOYNO PUMPS • FOUNDED 1878

# ...Ready to "throw lead" four months sooner

Production of these cartridge cases might have been delayed 4 months for want of a hardened steel spindle. Instead, the spindle, used in cartridge manufacturing, will be delivered on schedule. And therein lies an idea you may find useful.

The subcontractor\* machining the spindles ordered a specified type of tool steel. Despite an A-1-a priority, the earliest *promise* he could get was 4 months.

To meet a desired Rockwell of C35/40, Frasse Technical Service recommended heat treated chrome moly SAE X4130 as a substitute. The chrome moly—entirely satisfactory for the job—was not only delivered *immediately*, but was easier to machine in the bargain!

Substituting is hardly a new idea—but are you using it to full advantage? If you are dissatisfied with your steel "promises," why not let Frasse Technical Service check "specs" with you? A Frasse Engineer will do his best to help you break the bottlenecks—and his services are "on us." Address or call: *Peter A. Frasse and Co., Inc.*, 17 Grand Street, N. Y. C. (Walker 5-2200) • 3921 Wissabickon Avenue, Philadelphia (Radcliff 7100, Park 5541) • 50 Exchange Street, Buffalo (Washington 2000) • Jersey City, Hartford, Baltimore, Rochester, Syracuse.

\*This is an actual case history. Names on request.

1816-1941 125<sup>th</sup> ANNIVERSARY



*Peter A.*  
**FRASSE**  
*and Co., Inc.*

*Distributor of*

SEAMLESS STEEL TUBING  
SAE ALLOY STEELS  
STAINLESS STEELS  
COLD FINISHED BARS  
WELDED STEEL TUBING  
DRILL ROD  
C. R. STRIP AND SHEETS  
MUSIC WIRE

## Ban on Bright Work May Be Only a Start

Washington

• • • The OPM action in ordering automobile manufacturers to discontinue the use of metal finish and bright work in body trim and accessories after Dec. 15, may be only the forerunner of even more drastic steps under the plan to double the speed and scope of the defense program.

Superimposing on industry a defense program double the size of the present effort, conceivably could bring not only passenger automobile production to a standstill but also the production of refrigerators, stoves, washing machines and other durable consumer goods, according to some observers.

OPM conceded that its prohibition would mean "a substantial loss of business" to companies which supply the automobile industry with bright finish parts, and it gave only these assurances to labor:

"The Labor Division of the Office of Production Management is working with management, labor, the armed services and local officials to transfer displaced workers in the automobile industry to defense jobs in a swift and orderly manner, to protect their seniority rights, give preference in hiring to those displaced, and to give special consideration in the placing of defense contracts to communities threatened with severe dislocation."

The order prohibits the use of bright finish, bright work, metal

**SMOKE SIGNAL:** British industry ratus designed for sea-going craft ing a trigger on a small canister can be seen for many miles.





finish, or body trim containing aluminum, copper, nickel, or chrome in the production of new passenger cars after Dec. 15. Effective immediately, the order bans the production of such bright work except in amounts necessary to complete passenger automobiles scheduled to be completed before Dec. 15.

Permission may be granted to use the restricted materials in the plating of bumpers and bumper guard assemblies, provided evidence is submitted that all possible conservation measures have been utilized and that usage will be held to "minimum practicable quantities."

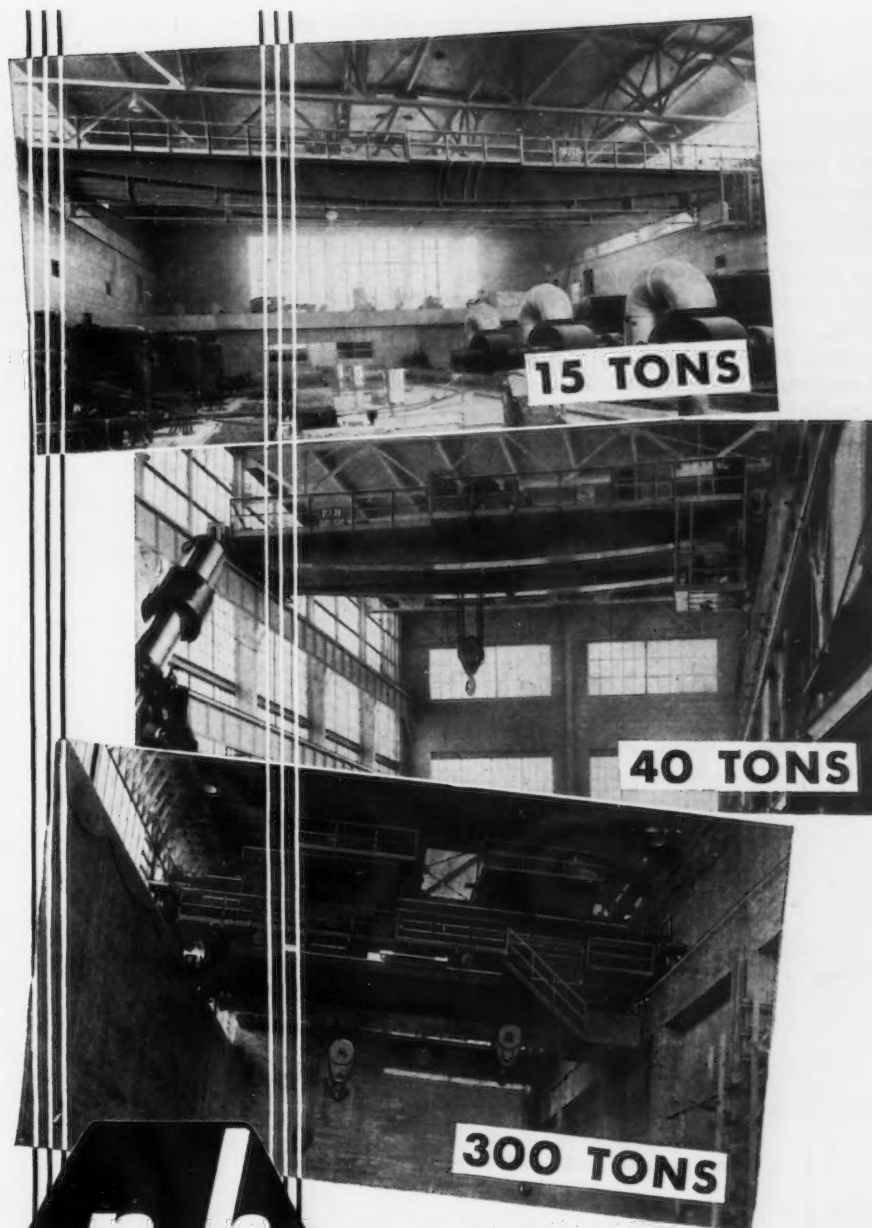
Unlike the order of Oct. 21, which specifically restricts the use of copper in certain automotive equipment, the latest order, announced Oct. 27, does not specify what constitutes bright finish, bright work, metal finish, or body trim, but it left no doubt that the restrictions apply without limitation to copper, nickel, chrome and aluminum.

### Canada Eliminates Duty On Plate for Disk Wheels

• • • Canada has removed the duty on steel plate used in the manufacture of disk wheels for army motor vehicles. The order states that steel disks for use in wheels for army vehicles may be imported duty-free from the United States, but that after Dec. 31, 1941, no more would be available from this source and steel plate would have to be imported and the disks manufactured in Canada.

has developed a new life-saving apparatus in the shape of a smoke trail. Press-releases a cloud of orange smoke which

*Photo by British Combine*



## ELECTRIC CRANES

Capacities from 5 to 300 Tons

Whatever your requirements in crane equipment, P&H can answer them with modern designs that assure you of efficient, economical service. Faster operating speeds and easier control enable you to meet the demands of today's increased production schedules.

And P&H's more than 50 years' experience in crane manufacture is your guarantee of recognized quality and performance.

America's oldest and only builder of complete electrical crane equipment.

General Offices: 4401 West National Avenue, Milwaukee, Wisconsin

# HARNISCHFEGER

CORPORATION

ELECTRIC CRANES • EXCAVATORS • ARC WELDERS



HOISTS • WELDING ELECTRODES • MOTORS

### Caramel Coated Ingots A Sweet New Wrinkle

••• Sugar-coated steel is a new product of the steel industry, according to the American Iron and Steel Institute. It is produced not to satisfy sweet-toothed consumers but to improve the surface of the steel.

The sugar coating is applied by a recently patented process in which absolutely dry, pure corn sugar is

blown on the inner surface of ingot molds. The coating tends to prevent splashed metal from solidifying on the walls of the mold. Pitch, tar and other materials have been used for years.

When sugar is used and temperature of the steel is right, the ingot is given an attractive, shiny caramel coating. The coating disappears during later manufacturing processes, and cannot be detected by the ultimate consumer.

### British Publish Study of Working Hours for Women

••• The most efficient maximum working hours for women in British industry have been found to be between 48 and 56 hr. a week, according to a bulletin "The Employment of Women" issued by the British Ministry of Labor and National Service. The bulletin, which encourages the employment of women in industry, says that the experience gained in the first World War showed conclusively that a work week exceeding 48 to 56 hours actually results in slower production.

The possibilities of using women, particularly married women, for shift work is also stressed in the bulletin. Among such arrangements cited is one in which a plant made use of two shifts, alternated weekly, of from 7 a.m. to 1 p.m. and from 1 p.m. to 7 p.m., which gives 55 hours of work a week from two women. In another instance, a firm makes use of a shift from 8 a.m. to 12:30 p.m. and from 12:30 p.m. to 5:30 p.m. The morning shift works six mornings a week, while the second shift works five afternoons a week.

**MASS PRODUCTION:** This photo of N. Y., shows the mass assembly for the Army Air Corps. The daily.

# ARMSTRONG



## Chrome-Vanadium Socket Wrenches

Standardize on **ARMSTRONG** Socket wrenches for these extra advantages:

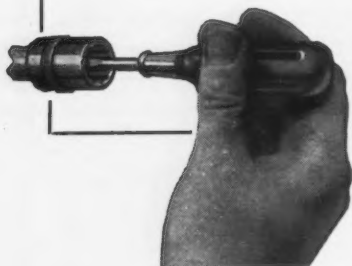
\*All Sockets, handles, drivers and extensions, are machined from special Chrome-Vanadium Tool Steel which gives greater strength, and at the same time, a thinner walled, handier, yet unbreakable socket.

\*ALL **ARMSTRONG** Ratchets, from 6½" reversible ratchet to the great 3 ft. reversible construction ratchets are drop forged steel, are smooth, compact and stronger, with all parts made of high tensile steel, carefully heat treated and hardened.

\* A complete line including all sizes and types, chrome or cadmium plated, singly or in sets. Write for Catalog C-39.



**ARMSTRONG BROS. TOOL CO.**  
"The Tool Holder People"  
309 N. Francisco Ave., Chicago, U. S. A.  
Eastern Warehouse & Sales:  
199 Lafayette St., N. Y.



\***ARMSTRONG** handles, extension and drivers have the patented **ARMSTRONG** Drivelock . . . which locks all parts of any wrench assembly together, prevents sockets from dropping or knocking off, prevents sections from parting. A quarter turn of a screw locks or unlocks the Drivelock. (½", ¾" and 1" drive.)





## Regulating Depot Nears Completion at Marietta

Marietta, Pa.

••• One of the government regulating depots, being built at Marietta, Pa., is gradually taking shape, and will be finished by the end of this year. Eight such depots will be built and war materials will be sent here as they leave manufacturers for storage until shipments can be made, thus relieving congestion around docks and freight yards.

From Marietta, on the main electrified freight line of the Pennsylvania Railroad, shipments can be made from the depot to New York, Philadelphia, Wilmington, Baltimore, and Norfolk within 24 hours. As supply ships enter the various ports, the depot will be notified, cargoes made up, and rushed to the piers and loaded on the boats. Another function of the depot is to sort and stock spare parts, accessories and replacements vital to modern mechanized war.

Construction of the depot is under the direction of Major C. W. O'Leary, construction quartermaster. Work started at Marietta in August and will be completed by late November.

## Large Plants Dependent On Daily Steel Receipts

Buffalo

••• While most important steel-consuming defense industries in this district are operating with steel inventories not exceeding 40 days' supply, a few large plants are dependent upon daily receipts of some shapes, sizes and types to meet production demands.

A producer of heavy steel castings for the Navy reported its steel supply would not last a month if supplies were cut off, and production in some departments would be delayed without daily receipts of certain types of steel bars. A marine engine company spokesman said steel inventories are confined to "possibly 40 days' supply," and a producer of shell casings said inventories of steel do not exceed 25 days' needs.



## Pattern FOR A BOMBER

Months before a new-model bomber is wheeled off the construction line, it is "born" in the loft of an aircraft plant. Here busy draftsmen lay out templates to insure hair-line accuracy in the finished plane.

Many of these templates are made of ARMCO Galvanized PAINTGRIP sheets. Draftsmen in aircraft plants like PAINTGRIP because it assures a workable surface, does not smudge, and is easily painted if desired. Extra wide sheets are available.

ARMCO PAINTGRIP is a bonderized zinc-coated sheet. Unlike ordinary

galvanized metal PAINTGRIP takes and preserves paint. It needs no pre-treatment and the bonderized film insulates the paint from the zinc.

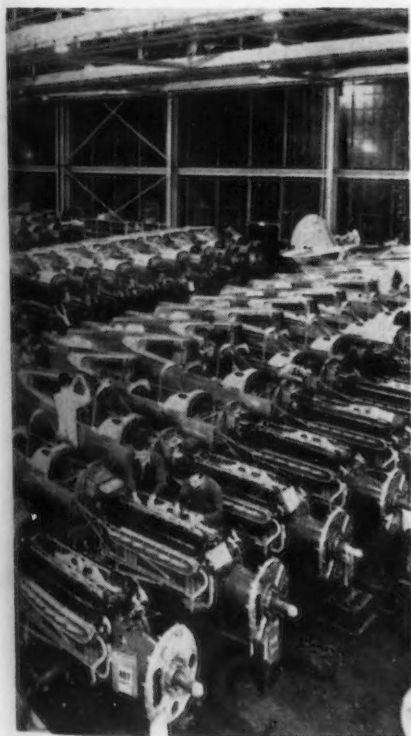
Airplane templates are only part of a growing list of "defense" uses for ARMCO Galvanized PAINTGRIP. New buildings, aircraft hangars, rolling doors, radio car bodies and bakery ovens for the army are a few others. Now is a good time to learn more about this unique galvanized sheet for your future needs. Just write The American Rolling Mill Co., 3121 Curtis St., Middletown, O.



# ARMCO PAINTGRIP

the Curtiss Wright plant at Buffalo, of the new Curtiss P-40 pursuit ships plant turns out at least 10 planes

Photo by International



## Allocation Move Coming on Steel

Washington

••• The OPM is developing an allocation system for steel which is expected gradually to replace the distribution of steel through priorities ratings with emphasis to be placed first on types of steel for

which there is the greatest defense demand. The move is prompted by a policy recommendation of SPAB and by reports by Army and Navy officials that, despite the priorities system, they are encountering increasing difficulties in securing structural steel, nickel steel, high-speed steel, tool steel and steel plate for defense requirements.

OPM officials said that because

of the size and complexity of the job and the personnel requirements, it will be some time before details can be developed. Director of Priorities Donald M. Nelson told a Congressional committee late in September that a system of allocations as a substitute for the existing preference ratings plan was under study by SPAB. He conceded that, although difficult to administer, an allocation program could be depended upon to avoid the practice of giving higher ratings upon application, a policy under which, he related, all applicants eventually get a "Double A" rating and "you find yourself right back where you started from."

## FTC Gathering Data on Steel Priorities Handling

Washington

••• OPM's compliance and field service section last week started a survey of operations of the iron and steel industry under priority regulations, turning over to the Federal Trade Commission the job of gathering "factual data" with instructions that FTC examiners will attempt no interpretation of orders nor give advice on procedures.

The survey follows an earlier policy statement by OPM that the Federal Trade Commission, the Labor Department's wage-hour division and other government bureaus will actively assist OPM in a check-up of operations under the priority system. Field work covering the aluminum industry survey, the first to be launched by OPM, was recently completed by the wage-hour division.

OPM, indicating that some 30 integrated steel companies and 200 smaller companies will be examined, emphasized that the survey is being made for the purpose of gathering basic information, and added:

"The examiners will report factually how iron and steel companies are operating under priority regulations, and will not attempt to interpret orders or to give advice about procedures. If errors in procedure or difficulties in following regulations are encountered, these matters will be handled by the Priorities Division."



Efficient and economical plant operation is vital to attain the unprecedented production levels demanded by the National Defense program.

The dependability and long life built into every GARLOCK quality product today, as always, contributes to efficient plant operation by reducing production time losses due to shut-downs for frequent replacement of packings and gaskets.

THE GARLOCK PACKING COMPANY  
PALMYRA, N. Y.

In Canada: The Garlock Packing Co. of  
Canada Ltd., Montreal, Que.



# GARLOCK



## Steel Cartridge Case Tests are Successful

••• With little prospect of an easing of the tight copper supply situation in sight, defense officials have been concentrating considerable effort on an attempt to develop a steel cartridge case. It is reported that these efforts are meeting with considerable success. Within the past few months United States arsenals have perfected technique for making cartridge cases which has proven very successful in all tests to date.

At the close of the first World War, the United States government had a number of engineers studying the possibility of using steel as a cartridge case material. Three chief obstacles met by these engineers were: (1) Steel would not take the severe draws required for deep cases, (2) the cases always froze in the barrel and were difficult if not impossible to extract and (3) the rusting of the steel caused early deterioration of the case.

However, the better knowledge of steel metallurgy developed over the past 20 years makes possible now the extremely severe draws and, with proper heat treatment, has given a very high yield point.

A high grade steel is used in the new steel cases, which is heat treated after forming and then copper plated to prevent rusting. Many thousands of the new cases

are reported to have been already made.

As far as is known, no other country has successfully developed a technique for producing steel cartridge cases, although there have been many attempts made in Germany and Russia. The Germans are reported to have tried the use of plastic cases, but these were not satisfactory. Russians have also tried steel cases,

but apparently they did not meet all requirements.

Development of a steel cartridge case, while putting an added burden on the steel industry, will be of tremendous importance in relieving part of the strain now on the copper and brass industry in supplying the great quantities of the non-ferrous materials required to provide shells for a modern army.



## BOUT of the O'TOOLS

### A 10-ROUND FAMILY FIGHT FOR YOUR BENEFIT

The Rotor Analyst has decided to let AIR and HIGH-CYCLE tools—his two hard-hitting production champs—have it out! Each of 10 rounds will be staged in a different plant under that plant's unique conditions. Blow-by-blow reports of this bout will help show you how to whip *your* portable tool problems.

Would AIR or HIGH-CYCLE win

*in your plant?* Let the Rotor Analyst demonstrate each type of tool and give you an unbiased recommendation to make sure you get peak production and lowest operating cost.

*Need more portable tool punch for defense production?* The Rotor Analyst has a particularly attractive plan to equip you at a fraction of the cost you might expect.

The Rotor Analyst has 65 different AIR tools and 59 different HIGH-CYCLE tools with which to solve your problems.



### Coming Events

Nov. 11 to 13—National Aircraft Standards Committee, annual meeting, Hotel Lexington, New York.

Nov. 13 and 14—Society of Automotive Engineers, National Transportation and Maintenance Meeting, Hotel Statler, Cleveland.

Dec. 1 to 6—18th Exposition of Chemical Industries, Grand Central Palace, New York.

Dec. 3 to 5—Institute of Cooking and Heating Appliance Manufacturers, annual convention, Cincinnati.

\*Dec. 6 to 13—National Motor Truck Show, Philadelphia.

January, 1942—American Society of Heating & Ventilating Engineers, annual exposition, Philadelphia.

Jan. 12 to 16—Society of Automotive Engineers, annual meeting and engineering display, Detroit.

\*Tentative.

## A-3 Given Steel Plant Repair and Maintenance

Washington

• • • Anxious to maintain production at its high levels of the past few months, OPM's Priorities Division last Friday issued a comprehensive repair and maintenance

order for the iron and steel industry.

Essential repair, maintenance and operating material were given a basic preference rating of A-3, material necessary to repair actual breakdowns was given an emergency rating of A-1-a and an A-1-c rating was given for advance purchases of material designed to avert breakdowns and suspensions. It was stated that the high break-

down ratings, however, may be applied only with the express permission, obtained in advance, of the Director of Priorities.

Plants to which this assistance is extended include those engaged in the production of pig iron, primary forms of steel, blast furnace coke, and ferroalloys. Producers must file with the OPM Iron and Steel Branch, an acceptance of the order, and a statement of past inventories and consumption, on an acceptance of the order, and a statement of past inventories and consumption, on Form PD-148, before applying the basic preference rating assigned by the order. Once authority to do so has been granted, and a serial number assigned, no further application need be made for use of the A-3 rating. A producer, or a supplier, must endorse on his purchase orders a statement to the effect that the rating is being applied under the terms of Preference Rating Order P-68, and must file periodic reports with OPM.

Ratings may be applied by a producer to repair, maintenance and operating items, and by a supplier of material directly required by a producer for these purposes, or to material which is to be physically incorporated in other material to be used by his customer in the same way.

Producers, as defined in Schedule A, attached to the order, are those who turn out:

1. Pig iron and ferroalloys.

The following iron and steel products, including alloys: Ingots, blooms (including forged), billets (including forged), slabs (including forged), tube rounds, sheet and tin bars, structural shapes, piling, plates (universal and sheared), rails, tie plates, track spikes, splice bars, rail joints, hot-rolled bars (including hoops and bands and concrete reinforcing bars), cold-finished bars, pipe and tubes (except conduit), wire rods, wire as drawn (not including further fabrication therefrom), black plate, tin and terne plate, sheets, strip, tool steel bars (including high speed), steel wheels and axles (for railroad use only), railroad locomotive tires, armor plate, ordnance forgings, steel castings (rough as cast), skelp, rolling mill rolls, ingot molds.

3. Coke for use in the production of pig iron and ferroalloys.

# ANOTHER

**tough Defense Job**

**licked by Special**

**Wyandotte Product**

**C**LEANING large aluminum alloy castings for use in National Defense is a tough job. Low tolerances demand checking with master gauges to see that no metal has been lost during cleaning. Time allowances are short. Emergency schedules don't permit rejects.

Wyandotte MK-50 Solvent Detergent is the metal cleaner that takes the bugs out of this cleaning operation. For this new, quick-action detergent does not attack aluminum or its alloys. Castings have the same measurements after cleaning as they had before.

The only steps necessary in the entire cleaning operation are spray cleaning and rinsing prior to anodizing. . . . Your Wyandotte Service Representative will be glad to demonstrate the swift, sure action of MK-50, or any other Wyandotte Metal Cleaning Compound. Call him today.



**THE J. B. FORD SALES CO.**  
**WYANDOTTE, MICHIGAN**



## Coal Mine Issue

### Nears New Turn

•••The captive coal mine controversy, which holds widespread implications, was nearing a new turn this week. After four days of idleness which led to the loss of blast furnace output, miners returned to work last week under a truce reached between John L. Lewis and Myron C. Taylor, former board chairman of United States Steel Corp., which provided that the National Defense Mediation Board would reopen hearings on the closed shop issue. Lewis set a new strike deadline for Nov. 15.

Hearings which started Monday before the NDMB were viewed in some circles as only a matter of form.

*For details of the Pacific Coast Welders' strike which has been interfering with defense production, see "The West Coast" column on page 82 of this issue.*

The President had merely required a board recommendation for or against the open shop with the understanding that "neither party is committed in advance to accept the final recommendations." Mr. Taylor said the steel companies would accept the board's recommendation. Mr. Lewis made no such commitment.

The implication was clear that if the board did not recommend a closed shop the strike will be resumed, despite Presidential appeals, an open defiance of the Government itself.

At Washington reports are current that, to soften its action, the board, if it votes for the closed shop will point out that the action is not to be taken as a precedent. This, it is generally conceded, will mean nothing. Rather a closed shop vote is expected to be followed by an intensified drive by SWOC for a closed shop in the steel industry.



#### Pittsburgh

Close to 10,000 tons of pig iron and about 5000 tons of steel were lost here last week due to strikes.

Although the "captive" mine strike was settled in time to prevent a large scale loss in steel in-

gots, four blast furnaces at Carnegie-Illinois Steel Corp. were forced down from Wednesday to Saturday night. With these furnaces out of production about 10,000 tons of pig iron, one of the tightest raw material items in steel making, were lost. None can be made up owing to all units having been working at full speed before the shutdown.

A strike of 200 cranimen at the

Homestead works of Carnegie-Illinois last week caused a loss of several thousand tons of steel as it became necessary to shut down 16 open hearths and the entire structural steel department for a few days. This strike caused 3000 workmen, not involved in the dispute, to lose two days' earnings. The cranimen went back to work late last week.



## That's DIAMOND "G" Service

When we say no order is too big for Diamond G Service, we mean it! Recently a large automotive plant sent a wire on Wednesday ordering 23,770,000 Diamond G Lockwashers. On Friday the full shipment was rolling away in freight cars.

Yes that's typical Diamond G delivery service. And every Diamond

G Lockwasher is made of the best materials... best workmanship... with the most modern equipment we think a lockwasher requires.

If you want quality, plus quick deliveries on all types of lockwashers... at low prices... get in touch with George K. Garrett Company, "Department 1A", 1421 Chestnut St., Philadelphia, Pa.



Toughy Dan Says

Your order shipped the same day... or else!.

**FREE**

Write for your metal rule for measuring lockwashers, bolts, etc.



**DIAMOND G LOCKWASHERS**

## Copper Products

### Prices to Be Fixed

Washington

• • • OPA has acted to bring under its scrutiny thousands of products made of copper at both the manufacturing and distribution levels, preliminary to imposing price ceilings if necessary.

The program will be carried out by OPA commodity sections already established, including those handling non-ferrous metals, durable consumers goods, building materials, industrial machinery and chemicals.

Contemplated by OPA under its program are:

(1) The issuance of price schedule establishing present prices as a maximum for building hardware,

after which detailed studies aimed at reducing such price substantially below present levels will be undertaken. This will be followed by schedules establishing ceilings for other copper building products as they may be necessary.

(2) A meeting with manufacturers of wire and cable to discuss OPA proposals for reducing present prices. In the past year such prices have risen 20 to 30 per cent.

(3) Completion of field investigations on the prices of non-ferrous foundry products and the issuance of price schedule unless the industry voluntarily agrees to reduce prices.

(4) A continuance of the informal agreements in effect with operators of brass mills. Prices for products fabricated from brass will be brought under ceilings as rapidly as necessary, OPA said.

(5) The focusing of attention on prices of all durable goods and their parts made largely of copper.

Curtailment of raw material supplies alone is not regarded by Mr. Henderson as justification for raising the price of any manufactured article. Accordingly, OPA's plans for dealing with products made largely of copper will be based on this premise and will be rigidly followed.

Manufacturers and distributors should beware of building up inventories in anticipation of future orders since they may well find themselves trapped with materials and products bought at high prices when the ceilings are issued, OPA officials stated. Forward buying was also said to have the effect of helping create an artificial scarcity, thus putting further pressure on the price structure.

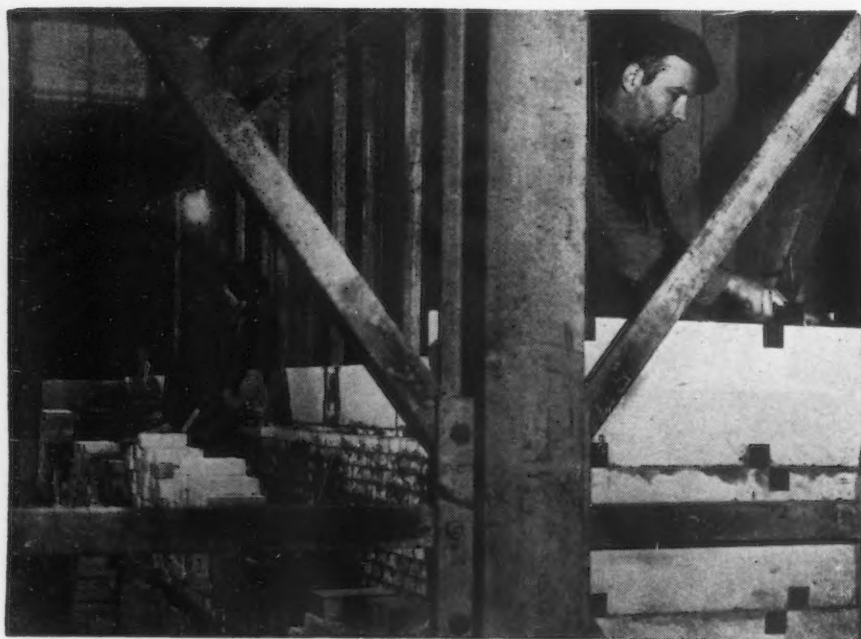


• • • **Answers** to a number of questions pertaining to the recent order curtailing copper use in civilian products (Order M-9-c) have been issued by OPM. Some of the questions and answers are given below.

**Q.** What metals are covered by this order?

**A.** Pure copper, brass, bronze, and any other copper alloy in which the percentage by weight of metallic copper is 50 per cent or more.

**Q.** Do the restrictions in paragraph



# Therm-O-flake B B INSULATING BLOCK

## SUPERIOR HIGH TEMPERATURE INSULATION

Has smooth, perfectly plane surfaces that make tight-fitting joints.

Provides extra efficient insulation over a wide temperature range.

Widely used in steel plated furnace walls and is quite water resistant.

Extra strong, sharp edges and corners insures minimum loss thru breakage.

Supplied in all standard block sizes and lagging, also in a wide variety of tailor made special shapes.

Write for Information and Prices

Other **Therm-O-flake** Products

Made from Exfoliated Vermiculite

**Granules - Brick - Block - Concrete**



JOLIET, ILL.



(a) apply only to the items actually mentioned on list A?

A. No. The restrictions apply to the specific items and any component part of any item.

Q. Is the use of the restricted metals in the manufacture of the items on list A immediately prohibited?

A. No. Until Jan. 1, 1942, manufacture may be continued at a reduced rate. After Jan. 1, the restricted metals may be used in manufacture of the listed articles only for plating, in certain cases, and under the exceptions found in paragraph (c).

Q. In computing the amount of copper or alloy which may be used in making the listed items until Jan. 1, 1942, does the manufacturer have to include metal used between Oct. 15 and the effective date of the Conservation Order?

A. Yes. The permitted amount of copper or alloy is to cover all use in making the listed articles during the whole 2½ months' period.

### Managers Appointed in 3 New Contract Offices

Washington

••• Appointment of three managers of newly-created field offices of the Contract Distribution Division of OPM was announced by Director Floyd B. Odum. F. J. Holman is manager of the office at Albany, N. Y. T. D. Harter is manager of the office at Syracuse, N. Y. T. Wilbur Weger is manager at Spokane, Wash.

### Southern Iron Rate 100%

Birmingham

••• Pig iron production in the Birmingham district returned to capacity Nov. 1 with the blowing in of No. 2 blast furnace at Thomas Works here of Republic Steel Corp. The furnace, one of the district's 19, was taken off Oct. 24 for repairs. It was put back on foundry iron.

### Allis-Chalmers Earnings Up

Allis-Chalmers, Milwaukee, reports net income for the third quarter of \$1,781,216 or \$1 a share on common stock. This compares with \$1,159,638 for the same period in 1940.

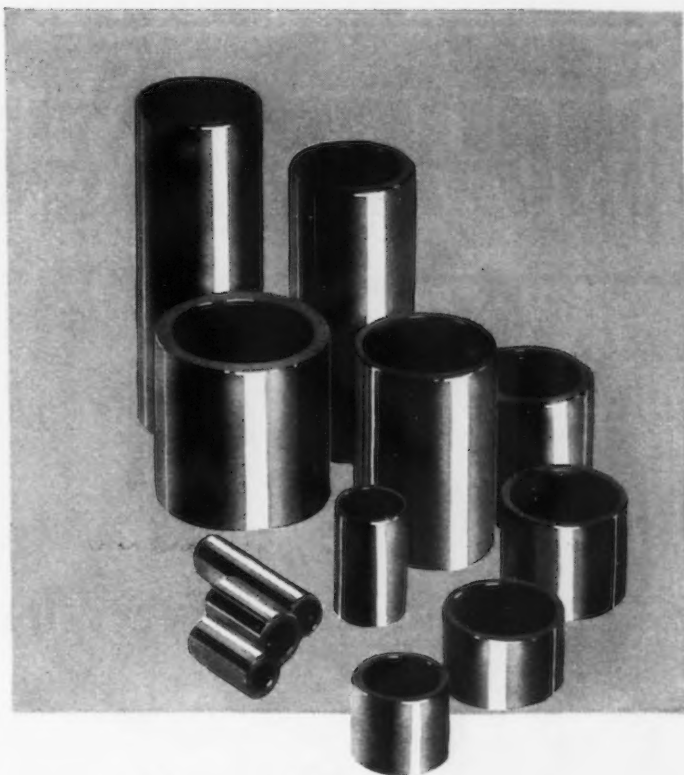
### Foundry Apprentice

#### Contest Approved by A.F.A.

••• Plans for the 1942 apprentice competition in gray iron, steel and non-ferrous molding and pattern making have been approved by the apprentice contest committee of the American Foundrymen's Association. The competition is opened

to indentured apprentices in any shop. First prize is \$30, second \$20 and third \$10 in each of the four competitions.

Local competitions are permitted between individual foundries and pattern shops, or by groups or chapters. Rules of the contest are obtainable by writing the association at 222 West Adams Street, Chicago.



*... It will pay you to*  
**STANDARDIZE**

• If you are having trouble securing your needs in plain bronze bearings . . . perhaps we can help you. Compare your required sizes with our list of stock items. The chances are ten-to-one that, from our list of over 850 sizes, we can fill your order . . . right off the shelf.

• Johnson GENERAL PURPOSE Bronze Bearings are cast in S.A.E. 64—the favorite alloy of engineers and maintenance men everywhere. Each bearing is machine finished to standard tolerances and ready for immediate assembly. Complete stocks are carried in all of our 22 warehouses. Write for a copy of our latest catalogue and see for yourself how it will pay you to STANDARDIZE on Johnson General Purpose Bearings.



**JOHNSON BRONZE**

*Sleeve BEARING HEADQUARTERS*

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## 5 Steel Companies Report Profits Up

••• While first examination of the third quarter net earnings of the first 19 steel producers reporting would indicate that the industry as a whole substantially increased their profits over the preceding quarter, further analysis shows that increased profits were confined

to a few of the major producers. A survey of steel's third quarter earnings by THE IRON AGE reveals that, while total earnings for the industry are up 6.97 per cent from the second quarter, a gain of 38.3 per cent was made by the U. S. Steel Corp. alone, whose quarterly net profits increased \$9,498,594, as against the total gain of \$4,500,183 by the 19 companies listed.

Other major steel companies

earning more than \$1 million during the third quarter did not report gains in proportion to those of the U. S. Steel Corp. Of the eight in this class, one showed earnings increases of more than \$1 million from the second quarter, one showed earnings up about \$50,000, and the remaining five producers reported that earnings had dropped.

**Small producers** did not fare as well as the large ones, with only two of the ten in the survey, Sharon Steel Corp. and Allegheny-Ludlum Steel Corp. reporting increased earnings during the third period.

Federal income and excess profits taxes are the major non-productive cost item in the earnings reports, with increased material costs, high labor costs, and loss of production by strikes and deficiencies of raw materials, especially scrap, also cutting heavily into operations and profits. Taxes take a major share of the increment in net earnings of these companies for the quarter, and actually exceed the total net profits in many instances, reducing profits available to the credit of the stockholders who had supplied the industrial capital used to produce the net income.

## Heppenstall to Run Alloy Plant for Navy

••• The Heppenstall Co., Pittsburgh, will operate the Federal Alloy Steel Corp.'s plant at Eddystone, Pa., recently acquired by the Navy Department in what the federal court stated to be the first time the government has ever taken over an entire plant for national defense purposes through the right of "eminent domain."

Heppenstall Co., which, in addition to their Pittsburgh plant, has a plant at Eddystone, will place the 34½ acre Federal plant into the production of steel forgings for the Navy within a few months. A check for \$600,000 was deposited by C. J. Todaro, Special Assistant Attorney General, and he stated the government considers this a fair price.

## United Gets Award

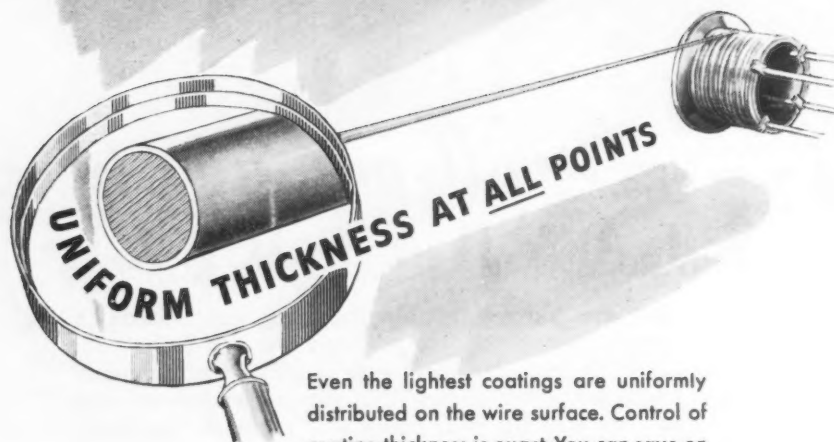
••• Aluminum Co. of America has awarded a rolling mill and auxiliaries for its \$15,000,000 blooming mill at Messina, N. Y., to United Engineering & Foundry Co.

# ECONOMIZE ON ZINC

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## MEAKER PROCESS

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Even the lightest coatings are uniformly distributed on the wire surface. Control of coating thickness is exact. You can save on zinc, produce more perfect coatings, make more profit with Meaker Process for Electro-Galvanizing Wire.

"A proven success by every test"

WE INVITE YOUR INQUIRY

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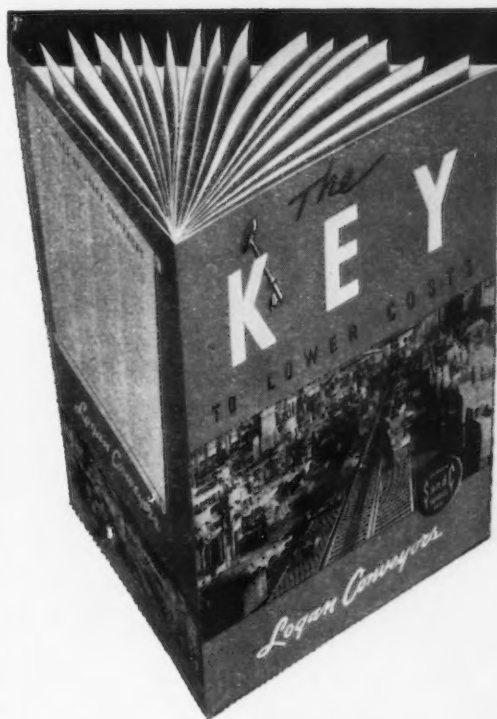


## Government Awards

### War Dept., Ordnance:

Acme Machine Tool Co., Cincinnati; turrets, jaws, screws and socket wrenches .....	\$1,323
Ahlberg Bearing Co., Chicago; ball bearings .....	4,426
Air Reduction Sales Co., New York; bronze rods .....	2,454
Aluminum Co. of America, Washington; aluminum sheets .....	1,156
Aluminum Specialty Co., Manitowoc, Wis.; cartridge cases .....	446,750
American Brake Shoe & Foundry Co., American Forge Division, Chicago; shells .....	756,730
American Broach & Machine Co., Ann Arbor, Mich.; special tooling, broaches, and gun grooving machines .....	152,995
American Chain & Cable Co. Inc., Andrew C. Campbell Division, Bridgeport, Conn.; swaging machines .....	2,897
American Locomotive Co., Railway Steel-Spring Division, New York; helical springs .....	4,964
American Manganese Bronze Co., Philadelphia; bronze manganese .....	3,939
American Steel & Wire Co. of N. J., Philadelphia; firing pin springs .....	4,150
American Tool Works Co., Cincinnati; machine tools .....	80,297
American Type Founders, Inc., Elizabeth, N. J.; guns .....	2,551,500
Athey Truss Wheel Co., Chicago; trailers .....	38,215
Atlas Imperial Diesel Engine Co., Mattoon, Ill.; shells .....	770,804
Autocar Co., Ardmore, Pa.; guide blocks .....	1,833
Automatic Die & Products Co., Cleveland; punches and dies ..	2,275
Avey Drilling Machine Co., Covington, Ky.; drilling machines ..	19,753
Babcock & Wilcox Tube Co., Beaver Falls, Pa.; seamless steel tubing .....	4,354
Bantam Bearings Corp., South Bend, Ind.; bearings .....	7,486
Barber-Coleman Co., Rockford, Ill.; machine tools .....	120,570
Barnes Drill Co., Rockford, Ill.; machine tools .....	225,932
Bendix Aviation Corp., Eclipse Aviation Division, Bendix, N. J.; parts for tanks .....	14,733
Bendix Aviation Corp., Marine Division, Brooklyn; repeaters ..	28,875
James G. Biddle Co., Philadelphia; testers .....	12,798
Fred K. Blanchard Inc., Troy, N. Y.; electric hoists .....	1,401
Bliss & Laughlin, Inc., Harvey, Ill.; steel, carbon & manganese steel bar .....	11,159
Bonney Forge & Tool Works, Allentown, Pa.; wrenches .....	14,215
Booth Machine Works, Lakewood, N. J.; jigs and fixtures .....	1,347
Boye & Emmes Machine Tool Co., Cincinnati; engine lathes .....	76,546
Boye & Emmes Machine Tool Co., Cincinnati; lathes .....	4,341
Bradford Machine Tool Co., Cincinnati; gear head lathes and oil pumps .....	259,527
Braeburn Alloy Steel Corp., Braeburn, Pa.; steel .....	1,399
Breeze Corps., Newark; elbows and nuts .....	4,070
parts for tank .....	2,790
J. G. Brill Co., Philadelphia; carriages .....	1,042,560
Brown and Sharpe Mfg. Co., Providence; grinding machines, vises and tools .....	548,149
milling machines .....	13,107
E. G. Budd Mfg. Co., Philadelphia; suspension bands, trunnion bands and cluster adapters .....	26,177

Buell Die & Machine Co., Detroit; dies .....	1,545
Builders Iron Foundry, Providence; telescope mounts .....	198,684
Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.; tank tracks .....	2,246,868
Carbide Tool Co., Chicago; reamers, cutters and arbors .....	15,100
Carborundum Co., Niagara Falls, N. Y.; segments for anti-aircraft production .....	1,284
Carlton Machine Tool Co., Cincinnati; machine tools .....	79,692
Carnegie-Illinois Steel Corp., Chicago; plates for tanks .....	77,159
Chase Brass & Copper Co., Waterbury, Conn.; brass rod .....	325,556
Chaso Tool Co., Royal Oak; heads, die, grinders and chasers .....	23,770
Chicago Pneumatic Tool Co., Boston; wrenches .....	1,795
Chicago Tramrail Co., Chicago; crane hoists .....	1,440
Cincinnati Lathe & Tool Co., Cincinnati; machine tools .....	99,645
Cincinnati Milling Machine and Cincinnati Grinders, Inc., Cincinnati, Ohio; machine tools ...	349,447
milling attachments, arbor adaptors, etc. ....	327,798



*To* **HELP YOU**  
to:

**INCREASE  
PRODUCTION**

**INCREASE  
CAPACITY**

**MAKE ON-TIME  
DELIVERIES**

**CONSERVE  
MANPOWER**

**LOWER YOUR  
COSTS**

*...that's* **IDEAS**  
*in them that pages*

"OUTPUT doubled," "30% increase in production," "Time interval halved." So go the case examples described in the new Logan KEY book shown above, with perhaps an idea for you. Have you seen this book? Of particular interest to production officials and plant engineers. Write for copy today. LOGAN CO., Inc., 545 Cabel St., Louisville, Ky.

**Logan Conveyors**

# GOVERNMENT AWARDS

milling machines .....	1,084,305
grinders .....	119,543
Cohn & Rosenberger Co., Inc., Providence; booster cups .....	7,797
Colonial Broach Co., Detroit; broaches .....	6,375
Colt's Patent Fire Arms Mfg. Co., Hartford; guns .....	6,525,343
machine guns .....	1,809,150
Columbia Machine Tool Co., Hamilton, Ohio; crank shapers .....	12,365
Columbia Steel & Shafting Co., Pittsburgh; steel bar .....	2,621
Continental Machines, Inc., Minneapolis; grinders .....	2,375
Crucible Steel Co. of America, New York; steel .....	1,606
Cushman Chuck Co., Hartford, Conn.; lathe chucks .....	5,292

Dalzen Tool & Mfg. Co., Detroit; thread milling cutters .....	1,860
Dana Tool-D Nast Machinery Co., Philadelphia; metal saws and arbors .....	4,339
drills, reamers .....	2,699
Darling Valve & Mfg. Co., Williamsport, Pa.; shells .....	595,680
Davis Tool & Equipment Co. Inc., Chicago; hand taps .....	2,089
Maurice S. Dessau, New York; stones for grinding wheel dressers .....	2,044
Detroit Broach Co., Inc., Detroit; details, broach section .....	1,404
broach sections .....	1,197
Detroit Harvester Co., Dura Co. Division, Toledo, Ohio; cartridge cases .....	1,650,000

Henry Disston & Sons, Inc., Chicago; files .....	5,109
cutters .....	2,640
Donaldson Co., Inc., St. Paul; air cleaners .....	13,429
Eastern Bridge Co., Worcester; craneways .....	4,000
Eastern Industrial Sales Co., New York; trucks .....	5,945
Elgin National Watch Co., Elgin, Ill.; watches .....	303,864
Ex-Cell-O Corp., Detroit; machines, lapping, tool grinders ..	6,442
Factory Supplies Co., Rockford, Ill.; chisels and screw extractors	2,244
Federal Screw Works, Detroit; adapters .....	7,000
Fellow Machine Co., Detroit; slotting machines .....	4,090
Fellows Gear Shaper Co., Springfield, Vt.; machine tools .....	53,120
Ferracute Machine Co., Bridgeton, N. J.; bending brakes .....	14,465
Firth-Sterling Steel Co., Philadelphia; steel .....	1,072
Fitchburg Grinding Machine Co., Fitchburg, Mass.; grinding machines .....	109,620
Florence Stove Co., Gardner, Mass.; ammunition boxes .....	166,250
Fox Munition Corp., Philadelphia; thread rings and plugs .....	1,296
Frost Co., Kenosha, Wis.; cartridge cases .....	886,000
Gardner Machine Co., Beloit, Wis.; grinders .....	15,380
Garlock Packing Co., Chicago; oil retainers .....	1,169
Gary Screw & Bolt Co., Chicago; rivets .....	1,561
General Motors Corp., Detroit; guns .....	12,313,641
General Motors Corp., Delco Appliance Division, Rochester, N. Y.; directors .....	1,760,640
General Motors Corp., Inland Mfg. Division, Dayton, Ohio; manufacture of rifles .....	2,500
General Motors Sales Corp., New Departure Division, Bristol, Conn.; ball bearings .....	9,530
General Motors Corp., Ternstedt Mfg. Division, Detroit; magazines .....	13,050
General Motors Sales Corp., Detroit; trucks .....	1,941
General Time Instrument Corp., Westclox Division, LaSalle, Ill.; fuzes .....	965,000
Thomas B. Gibbs & Co., Delavan, Wis.; machines, static regulating .....	4,400
G. M. Gibson Co., Bellevue, Iowa; drifts and punches .....	5,893
Giddings & Lewis Machine Tool Co., Fond Du Lac, Wis.; horizontal boring, drilling, and milling machines .....	75,800
Gisholt Machine Co., Madison, Wis.; machine tools .....	107,600
machines .....	5,250
Globe Steel Tubes Co., Milwaukee, Wis.; seamless steel tubing .....	5,803
George Gorton Machine Co., Racine, Wis.; machinery .....	81,358
Gould & Eberhardt, Irvington, N. J.; machine tools .....	63,048
Graybar Electric Co., Albany, N. Y.; lighting fixtures .....	2,123
Great Lakes Steel Corp., Ecorse, Detroit; steel .....	12,365
Greenfield Tap & Die Corp., Greenfield, Mass.; gages .....	1,771
Grenby Mfg. Co., Plainville, Conn.; grinders .....	2,923
Gries Reproducer Corp., New York; gages .....	1,044
Hamilton Metal Products Co., Hamilton, Ohio; steel chests ..	6,260
Hanson-Whitney Machine Co., Hartford; machines, thread milling .....	9,600
Louis Hanssen's Sons, Davenport, Iowa; wrenches .....	4,055
Hardinge Bros., Inc., Elmira, N. Y.; lathes .....	1,475

## Neloy steel mill pinion

### FLAME HARDENED TEETH AND WABBLERS



This unretouched photograph shows clearly the discoloration characteristic of flame-hardening on the teeth, wabblers, and flanges of this pinion.

**SPECIAL** Steel for special requirements is daily routine at the National-Erie Corporation. For instance, this large flame-hardened herringbone mill pinion with 16 cast teeth, 6.283" circular pitch, 25" face, 32" pitch diameter, 35.144" outside diameter shaft 6 1/2" over all. Weight unmachined 12,620 lbs. . . Machined, 11,200 lbs. . . Put YOUR problem up to National-Erie . . . take advantage of National-Erie's prompt efficient service and the cost savings that go with One Responsibility . . . One Control.

**NATIONAL-ERIE**  
CORPORATION  
ERIE, NE PA, U.S.A.



## GOVERNMENT AWARDS

Harrington and Richardson Arms Co., Worcester; pistols .....	2,402,982
Hartford Electric Steel Co., Roxbury, Mass.; steel collars and castings .....	1,502
E. F. Hauserman Co., Boston; metal partitions .....	2,491
Heald Machine Co., Worcester; machine tools .....	146,995
Hendey Machine Co., Torrington, Conn.; machine tools .....	86,802
lathes .....	363,281
Hodge Boiler Works, Boston; tanks .....	4,420
Hoe Company, Inc., New York; machine tools .....	52,230
R. Hoe & Co., Inc., New York; parts, excess recoil mechanism .....	1,903
Illinois Tool Works, Chicago; broaches .....	1,980
Independence Pneumatic Tool Co., Chicago; machine tools .....	135,740
Indianapolis Machinery & Supply Co., Indianapolis; grinders .....	2,925
Ingersoll-Rand Co., Boston; drills .....	1,942
International Harvester Co., Milwaukee; shells .....	734,388
International Nickel Co. Inc., New York; cylinders, copper nickel alloy .....	116,012
JCH Automatic Machine Works, Philadelphia; dies and bushings .....	3,854
Jessop Steel Co., Washington, Pa.; tool steel .....	1,040
Johnston & Jennings Co., Cleveland; cylinders, copper nickel alloy .....	37,750
J. & W. Jolly, Inc., Holyoke, Mass.; iron castings .....	1,878
S. M. Jones Co., Toledo, Ohio; body forgings for shot .....	1,200,000
shot .....	1,400,000
Jones & Lamson Machine Co., Springfield, Vt.; machine tools .....	172,512
Karp Metal Products Co. Inc., Brooklyn; boxes .....	1,130
Kearney & Trecker Corp., Milwaukee; machine tools .....	415,116
Kessler Chemical Co., Inc., Philadelphia; chemical .....	33,800
H. Kramer & Co., Chicago; bronze, manganese .....	4,000
A. B. Landis Sons, Inc., Wyndmoor, Pa.; punches .....	7,272
Langlois Gauge Co., Detroit; gages .....	2,425
Lansdowne Steel & Iron Co., Morton, Pa.; forgings .....	3,135
Lapointe Machine Tool Co., Hudson, Mass.; machines, broach sharpening .....	3,500
R. K. LeBlond Machine Tool Co., Cincinnati; lathes, gun drilling, boring, and rifling machines .....	1,111,799
machine tools .....	354,391
Lees-Bradner Co., Cleveland; thread milling machines .....	88,200
Leidy Electric Co., Phillipsburg, N. J.; cable and wire .....	2,688
George H. Leland, Dayton, Ohio; cluster adapter assemblies .....	1,687
Lewis-Shepard Sales Corp., Watertown, Mass.; racks .....	10,119
Lincoln Tool & Die Co., Inc., Detroit; milling fixtures .....	1,149
punches and dies .....	3,776
Lindley Electric Supply Co., Philadelphia; fuses .....	1,083
Lodge & Shipley Machine Tool Co., Cincinnati; parts for lathes .....	1,328
machine tools .....	316,411
Ludlow Typograph Co., Chicago; typograph machines .....	4,499
Lyon Metal Products, Inc., Davenport, Iowa; boxes .....	2,580
Machinery & Welder Corp., Moline, Ill.; electrodes .....	1,113
welders .....	2,059
Manning, Maxwell & Moore, Inc., Shaw Box Crane & Hoist Division, Muskegon, Mich.; parts for cranes .....	1,142
Clayton Mark & Co., Evanston, Ill.; steel tubing .....	2,883
Masterform Tool Co., Chicago; cutting tools .....	9,799
Mattatuck Mfg. Co., Waterbury, Conn.; screws .....	2,500

McArdle & Cooney, Inc., Philadelphia; pipe fittings .....	3,068
McCord Radiator & Mfg. Co., Detroit; manufacture of clip filling machines .....	10,000
heaters .....	2,022
Merz Engineering Co., Indianapolis; gages .....	8,486
Metal Box & Cabinet Co., Chicago; steel chests .....	10,022
Metal Goods Corp., St. Louis; brass rods, copper rods, copper, naval brass and copper tubing .....	5,130
Midwest Tool & Mfg. Co., Detroit; extension holders .....	1,269
Miller Printing Machinery Co.,	

Pittsburgh; gun mounts, spare parts, etc. ....	503,047
Milwaukee Saddlery Co., Milwaukee; mortars and mounts .....	8,310
Modern Machine Corp., Brooklyn; fixtures .....	1,368
Modern Tool & Die Co., Philadelphia; gages and percussion primers .....	9,020
Morris Machine Tool Co., Cincinnati; radial drilling machines .....	25,488
Morse Tool Co. Inc., Detroit; tools .....	76,920
Murchev Machine & Tool Co., Detroit; chasers, die heads, etc. ..	632
National Acme Co., Cleveland; machine tools .....	473,934

## LIGHTER GAUGE STAMPINGS, too



The versatility of our men and machines is limited only by the needs of those who entrust to us the important task of producing their stampings.

In the instance illustrated, a Tank Rim for an electrical transformer—16¾" long, 18⅞" wide and 5¼" deep—was stamped out of steel .075" thick. Yet each angle, arc, port and flange is clean and clear—and true to gauge.

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Let us review your requirements.

# PARISH PRESSED STEEL CO.

READING, PA.

PACIFIC COAST REPRESENTATIVE, F. Somers Peterson Co., 57 California St., San Francisco, Cal.

# GOVERNMENT AWARDS

National Automatic Tool Co., Richmond, Ind.; machine tools. holesteel machines .....	60,825 60,825
National Machine Works, Chicago; parts for tanks .....	1,523
National Machinery Co., Tiffin, Ohio; machine tools .....	132,700
National Mineral Co., Chicago; cranks .....	1,066
National Pneumatic Co., Rahway, N. J.; guns .....	3,848,460
National Pressure Cooker Co., Eau Claire, Wis.; fuzes .....	290,000
National Supply Co., Toledo, Ohio; forgings .....	16,167
Niagara Machine & Tool Works, Buffalo; presses .....	1,147
Niles-Bement-Pond Co., Pratt & Whitney Division, West Hart-	

ford; machines, barrel reaming. machine tools .....	15,990 540,273
gages .....	12,700
Nirvana Mfg. Corp., Nirvana, Mich.; parts for tanks .....	8,515
Norris Iron & Wire Works, Inc., Bridgeport, Pa.; storage shed..	5,595
Norris Tool & Machine Co., Phila- delphia; stripper leaves .....	1,872
Northern Engraving & Mfg. Co., La Crosse, Wis.; cartridge cases	448,750
Norton Company, Worcester; ma- chine tools .....	166,503
grinders .....	34,301
wheels .....	2,532
O'Brien Machinery Co., Philadel- phia; planers .....	10,350
Ohio Seamless Tube Co., Shelby, Ohio; seamless tubing .....	6,601

Ohio Tool Co., Cleveland; machine tools .....	295,732
Onsrud Machine Works, Inc., Chi- cago; machine tools .....	125,386
Otis Elevator Co., Buffalo; steel castings .....	4,271
Penn Mfg. Co., Hartford; vises ..	1,378
Philco Corp., Philadelphia; fuzes	1,570,000
Pipe Machinery Co., Cleveland; gages .....	4,184
Precision Mfg. Co., Philadelphia; gages .....	7,042
Pressed Steel Car Co., Inc., Pitts- burgh; shells .....	310,000
Proctor & Schwartz, Inc., Phila- delphia; drying machines .....	1,880
Production Tool & Die Co. Inc., Springfield, Mass.; gages .....	1,119
Pullman Standard Car Mfg. Co., Butler, Pa.; shells .....	4,015,000
Pusey & Jones Corp., Wilmington, Del.; steel rings .....	2,824
Putnam Tool Co., Detroit; cutters, reamers, etc. ....	3,960
Reed Prentice Corp., Worcester, Mass.; machine tools and tool- room lathes .....	202,195
Reliance Steel Castings Corp., Pittsburgh; steel castings .....	2,035
Remington Arms Co., Inc., Ilion, N. Y.; Plant, Bridgeport, Conn.; rifles .....	9,808,800
Revere Copper & Brass, Inc., Rome Mfg. Co. Division, Rome, N. Y.; sockets, lower detonator .....	30,240
F. H. Robertson Co., Malden, Mass.; tools .....	1,650
Rock Island Metal Foundry, Rock Island, Ill.; castings .....	15,912
Rock-Ola Mfg. Corp., Chicago; am- munition boxes .....	951,333
Rockwood Alabama Stone Co., Rus- sellville, Ala.; shells .....	1,026,150
Rolock, Inc., Southport, Conn.; screens, wire mesh .....	4,425
Rumsey Electric Co., Philadelphia; wire .....	4,054
Russell, Burdall & Ward Bolt & Nut Co., Port Chester, N. Y.; nuts .....	2,834
Rustless Iron & Steel Corp., Balti- more; steel .....	5,086
Savage Arms Corp., Utica, N. Y.; rifles .....	30,404,798
Schneider, Bowman Co., Inc., Phila- delphia; shelves, brackets and plates .....	2,575
Scoville Mfg. Co., Waterbury, Conn.; fuzes .....	1,273,966
Scripto Mfg. Co., Atlanta, Ga.; locks and pins for boosters .....	3,360
Sharon Steel Corp., Sharon, Pa.; strip steel .....	11,316
Shaw-Box Crane & Hoist Co., Muskegon, Mich.; hoist motors for cranes .....	1,928
W. E. Shipley Machinery Co., Phila- delphia; parts for case turn- ing machine .....	2,433
shaper and equipment .....	3,584
John Simmons Co., Newark; pipe	1,753
A. O. Smith Corp., Milwaukee; am- munition .....	26,716,800
Smith & Mills Company, Cincin- nati; machine tools .....	86,100
Solar Sturges Mfg. Co., Melrose Park, Ill.; accessories, bundle packing .....	63,617
South Bend Lathe Works, South Bend, Ind.; machine tools .....	330,349
Sowers Mfg. Co., Buffalo; mixing kettles .....	31,875
Sperry Gyroscope Co., Inc., Brook- lyn; cams and dials .....	59,000
directors .....	14,901,500
Steel & Wire Products Co., Bal- timore; strapping steel .....	3,270
Sterling Products Co., Inc., Mo- line, Ill.; screws .....	1,900
Stevens Mfg. Mills, Muscoda, Wis.; ammunition boxes .....	460,030
Stewart-Warner Corp., Chicago; grease guns .....	1,047
fuzes .....	2,607,267
F. J. Stokes Machine Co., Phila- delphia; presses, punches and	



● One Shepard Niles electric monorail hoist gives "express service", indoors or out to any point in the plant or yard carrying loads of every description. Fur- nished with single or double hooks in capacities from 1/8 to 10 tons.

They are also ideally suited to the accurate control of any standard electro- magnet or grab bucket.

Write for catalogs illustrating and de- scribing the "Aerial Railway of Industry".



Shepard Track consisting of two special analysis T-rails clamped to the bot- tom flange of a standard I-beam insures a smooth, hard, long-wearing track for monorail hoists.

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HOISTS

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CRANE & HOIST CORP.

356 SCHUYLER AVENUE ... MONTOUR FALLS, N. Y.



## GOVERNMENT AWARDS

dies	9,262
Stoner Mfg. Co., Aurora, Ill.; cartridge cases	176,250
Surface Combustion Corp., c/o Wm. J. Murray, Syracuse, N. Y.; hardening furnaces	3,075
Taft-Peirce Mfg. Co., Woonsocket, R. I.; gages	4,392
Henry G. Thompson & Son Co., New Haven, Conn.; band saws	5,184
Thurston Mfg. Co., Providence; end mills	1,400
Timken Roller Bearing Co., Canton, Ohio; roller bearings	4,471
Timken-Detroit Axle Co., Oshkosh, Wis.; covers	1,275
Titeflex Metal Hose Co., Newark; conduits, flexible	1,710
Tokheim Oil Tank & Pump Co., Fort Wayne, Ind.; shot	2,791,090
Tool and Equipment Supply Co., New York; grinding machines	2,380
Tools & Gages, Inc., Cleveland; gages	11,788
Towmotor Co., Cleveland; lift truck	5,757
Triplex Machine Tool Corp., New York; pumps	3,094
Alfred A. Troyke, Cincinnati; machine tool attachments	9,270
Underwood - Elliott - Fisher Co., Hartford; fuzes	339,217
Union Twist Drill Co., Athol, Mass.; end mills	1,067
United Engineering & Foundry Co., Pittsburgh; howitzers	1,021,377
U. S. Automatic Corp., Amherst, Ohio; closing plugs	22,276
U. S. Cartridge Co., Baltimore; cartridges	1,157,200
U. S. Hoffman Machinery Corp., New York; vacuum cleaning units	2,178
shells	1,648,000
United States Machine Tool Co., Cincinnati; milling machines and dividing heads	1,915
Universal-Cycleps Steel Corp., Titusville, Pa.; steel	4,878
Utica Cutlery Co., Utica, N. Y.; bayonets	794,000
Vanhorn Machine Co., Blawnox, Pa.; sockets, lower detonator	19,316
Van Norman Machine Tool Co., Springfield, Mass.; tools and machinery	300,198
Verson Allsteel Press Co., Chicago; press brakes	3,470
Vickers, Inc., Waterbury Tool Division, Waterbury, Conn.; speed gears	289,991
Vortex Mfg. Co., Claremont, Cal.; air cleaners	16,684
Walsh Harness Co., Milwaukee; accessories	3,460
War Supplies, Ltd., Ottawa, Canada; tracks	506,250
Warner & Swasey Co., Cleveland; machine tools	165,390
Warnock Mfg. Co., Worcester; wrenches	6,390
Waterbury Farrel Foundry & Machine Co., Waterbury, Conn.; charging machines	20,000
S. Weinstein Supply Co., New York; padlocks	16,352
Western Cartridge Co., Winchester Repeating Arms Co. Division, New Haven, Conn.; rifles	5,791,200
Western Corp., Chicago; ball bearings	7,416
Westinghouse Electric & Mfg. Co., Davenport, Iowa; stabilizer units	4,007
White Motor Co., Cleveland; parts for scout cars	2,008
Wilde Drop Forge & Tool Co., Kansas City; bayonets	200,400
J. H. Williams & Co., New York; wrenches	2,620
Wisconsin Steel Co., Chicago; steel bar	4,122
John Wood Mfg. Co., Conshohocken, Pa.; galvanized steel boxes	982,100

J. R. Worcester & Co., Boston; installation of heat treating facilities	12,000
Wright Aeronautical Corp., Paterson, N. J.; parts	1,188
Yale & Towne Mfg. Co., Stamford, Conn.; padlocks	19,675
York Safe and Lock Co., York, Pa.; proof testing guns and carriages	29,909
Youngstown Sheet & Tube Co., Youngstown, Ohio; steel	3,351
War Dept., Corps of Engineers: Ace Drawing Equipment Corp., Vaux Hall, N. J.; drawing boards	\$2,275

Air Conditioning Engineers, Inc., Mobile, Ala.; refrigerators and water coolers	25,340
American Casting & Mfg. Corp., Brooklyn; roofing nails	2,579
American Hoist & Derrick Co., New York; hand power winches	2,750
American Radiator and Standard Sanitary Corp., Memphis, Tenn.; galvanized water pipe	2,502
Anchor Equipment Co., New York; coffee urns	9,570
Arnold Supply Co. Inc., Birmingham, Ala.; furnaces	3,793
Bethlehem Steel Export Corp., New York; steel piling	2,675
steel pipe	6,229

# STRONG - HEAT



## Annealing . . IN THE STRONG MANNER

Users of Strong steel castings are keenly aware of how much they gain in the elimination of internal stresses by the Strong heat-treating and annealing processes. The pit annealing furnace shown above is 15 feet wide by 19 feet long—amply large to heat-treat and anneal the largest of Strong-cast castings. It is oil fired and controlled by recording pyrometer.

Wherever it is desirable, Strong double anneals its castings for extra protection. Strong also uses a car type annealing furnace, oil fired with heat recorder control. Strong can tell a host of vital facts about heat-treating every steel casting buyer should know. Just ask for them.

STRONG STEEL FOUNDRY COMPANY, BUFFALO, N. Y.



## GOVERNMENT AWARDS

Binks Mfg. Co., Chicago; galvanized mixing material tanks ....	3,660
S. Blickman, Inc., Weehawken, N. J.; coffee urns .....	2,005
Butler Mfg. Co., Kansas City; prefabricated steel warehouses..	57,838
Carey Machinery & Supply Co., Baltimore; lathes .....	4,535
Caterpillar Tractor Co., Washington; graders .....	55,730
Chicago Pneumatic Tool Co., St. Louis; pneumatic screw drivers ..	2,820
Chicago Pneumatic Tool Co., St. Louis; pneumatic tools .....	3,075
Chicago, Rock Island and Pacific Railway Co., Chicago; used machine shop equipment .....	2,811

Contractors' Material Co., Jackson, Miss.; reinforcing steel ...	2,459
tie bars .....	6,075
Cyclone Fence Division American Steel & Wire Co. of New Jersey, Cleveland; fence, chain, link ..	13,680
Darby Products of Steel Plate Corp., Kansas City, Kans.; elevated steel water tank, West Coast Air Corps Training Center, Santa Ana, Cal. ....	62,333
DeWitt De Weese, Meridian, Miss.; trucks with trailers ....	6,075
Fairbanks Morse & Co., Atlanta, Ga.; service, fire, sewage lift and sump pumps .....	9,332

S. W. Flamm Supply Co., New York; stoves and stove pipe ....	4,083
Frey Industrial Supply Co., Los Angeles; rivet tool cribs .....	15,643
Furnace Supply Co., Birmingham, Ala.; furnaces .....	12,991
General Motors Corp., Chevrolet Division, Detroit; express and pickup trucks .....	3,529
Boyd H. Gibbons, Los Angeles; trucks .....	16,596
Hardinge Brothers, Inc., Elmira, N. Y.; hand screw machines ..	2,976
Homelite Corp., Port Chester, N. Y.; generators .....	2,631
Independent Pneumatic Tool Co., Chicago; pneumatic nut setters and drills .....	3,765
Industrial Construction Corp., Ltd., Los Angeles; cranes .....	7,798
Ingersoll-Rand Co., Washington; concrete vibrator and air compressor .....	55,124
pneumatic tools .....	2,377
International Harvester Co., Los Angeles; station wagons .....	24,105
E. B. Kelley Co., Inc., Long Island City, N. Y.; pile hammers and extractors and replacement parts ..	7,186
W. H. Kiefaber Co., Dayton, Ohio; vacuum pumps .....	4,049
A. Leschen & Sons Rope Co., St. Louis, Mo.; wire rope .....	108,438
Manhattan Boiler & Equipment Co., New York; boilers and spare parts .....	20,623
Martin Electric Co., Des Plaines, Ill.; electrical fixtures .....	3,974
McMaster-Carr Supply Co., Chicago; galvanized water pipe .....	2,930
Monroe Hardware Co., Inc., Monroe, La.; cable .....	5,190
Northwestern Motor Co., Eau Claire, Wis.; railway motor cars ..	6,700
Ohio Corrugated Culvert Co., Middletown, Ohio; corrugated iron pipe .....	5,791
Peterson & Haecker, Ltd., Blair, Neb.; work launches, U. S. Boatyard, Keokuk, Iowa .....	47,880
Republic Steel Corp., Cleveland; steel pipe .....	6,882
Thomas Sommerville Co., Washington; water supply equipment and wrench pipes .....	3,650
Sperry Gyroscopic Co. Inc., Brooklyn; searchlight demonstrator equipment .....	3,500
Sterling Motors Corp., Long Island City, N. Y.; spare parts for trucks .....	2,448
Truscon Steel Co., Youngstown, Ohio; hangar doors .....	55,500
United Steel Fabricators, Inc., Wooster, Ohio; steam tunnel cover plates .....	4,368
John Van Range Co., Cincinnati; miscellaneous kitchen equipment ..	5,915
Walton Viking Co. Inc., Kansas City; fire extinguishers .....	2,730
Harold Warren, Springfield, Ohio; dump and flat bottom bed trucks ..	11,404

### War Dept., Quartermaster Corps:

American Fork & Hoe Co., Cleveland; component parts for kits, tool, carpenters' and wheelwrights .....	\$560
E. C. Atkins & Company, Indianapolis; component parts for kits, tool, carpenters' and wheelwrights' .....	6,221
Belknap Hardware & Mfg. Co. Inc., Louisville; component parts for kits, tool, carpenters' and wheelwrights .....	546
Chicago Tool & Kit Mfg. Co., Chicago; component parts for tool kits, carpenters' and wheelwrights' .....	3,312
Chrysler Corp., Parts Division, Detroit; repair parts .....	77,295
parts for trucks .....	64,202
Federal Motor Truck Co., Detroit; trucks and trailers .....	53,820

● Mathews experienced field engineers can bring you the newest developments in the handling of materials. During the past few years many new and unique Mathews designs have appeared in the field of conveying equipment. Let your Mathews Field Engineer work with you toward the solution of your handling problem.

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## GOVERNMENT AWARDS

Firestone Tire & Rubber Co., Akron, Ohio; repair parts .....	9,301
Firestone Tire & Rubber Co., Akron, Ohio; parts for trucks .....	3,824
Ford Motor Co., Dearborn, Mich.; parts for trucks .....	98,898
General Motors Truck & Coach Division of Yellow Truck & Coach Co., Pontiac, Mich.; parts for trucks .....	240,236
Henney Motor Co., Freeport, Ill.; metropolitan ambulances .....	53,736
International Harvester Co., Ft. Wayne, Ind.; trucks .....	220,170
Longwill Scott, Inc., St. Louis; rehabilitation of Standard Gauge R. R. Track, Camp Grant, Ill.; construction of spur track, Kansas City QM Depot .....	16,574
Mack Mfg. Corp., Plainfield, N. J.; parts for trucks .....	9,674
F. H. Martell Co., Washington; construction of Ordnance repair shop, store house, portable steel igloos and Post Ordnance building, Ft. Myer, Va. ....	140,751
Mayhew Steel Products, Inc., Shelburne Falls, Mass.; component parts for tool kits, blacksmiths' .....	67,698
Measuring Device Corp., New York; component parts for tool kits, carpenters' and wheelwrights' .....	5,544
Metal Arts Company, Rochester, N. Y.; badges .....	823
Millers Falls Company, Greenfield, Mass.; component parts for kits, tool, carpenters' and wheelwrights' .....	9,869
J. B. Perusini Construction Co., Birmingham, Ala.; construction of Ordnance Shop with crane and boiler house, Ft. McClellan, Ala. ....	4,157
Justus Roe and Sons, Patchogue, N. Y.; component parts for kits, tool, carpenters' and wheelwrights' .....	49,288
Supplee-Biddle Hardware Co., Philadelphia; component parts for kits, tool, carpenters' and wheelwrights' .....	2,309
James Swan Co., Seymour, Conn.; component parts for kits, tool, carpenters' and wheelwrights' .....	1,062
U. S. L. Battery Corp., Niagara Falls, N. Y.; repair parts .....	2,683
Ventnor Boat Works, Atlantic City, N. J.; boats .....	1,012
George W. Warner & Co., Inc., New York; component parts for kits, tool, carpenters' and wheelwrights' .....	374,000
Yellow Truck & Coach Mfg. Co., General Motors Truck & Coach Division, Pontiac, Mich.; parts for trucks .....	1,401
	220,920

### War Dept., Chemical Warfare Service:

Acklin Stamping Co., Toledo, Ohio; brass eyerings .....	\$48,475
Continental Can Co. Inc., New York; canister assemblies .....	39,334
H. C. Cook Co., Ansonia, Conn.; tips, clinch, brass .....	13,753
Doehler Die Casting Co., New York; tail plugs and primer holders .....	1,150,000
	61,083
Handy and Harman, New York; brazing alloy, silver alloy .....	18,990
Peck, Stow & Wilcox Co., South- ington, Conn.; pliers .....	2,955
Spring Products Corp., Long Is-  land City, N. Y.; clasps .....	9,299
Stanley Works, New Britain, Conn.; outlet valve guards .....	5,430
United-Car Fastener Corp., Cam-  bridge, Mass.; brass clips .....	12,368
Vernon Co., New York; diaphragm  spacers .....	5,220
Waterbury Buckle Co., Waterbury,  Conn.; webstrap buckles .....	8,169
Watson-Stillman Co., Roselle, N.  J.; hydraulic presses .....	1,825

### War Dept., Air Corps:

American Propeller Corp., Toledo, Ohio; propeller blade assemblies .....	\$12,185,050
Bendix Aviation Corp., Pioneer In-  strument Division, Bendix, N.  J.; compasses and inverters .....	2,451,000
Crosley Corp., Cincinnati; shackle  assemblies .....	661,032
General Motors Corp., Delco-Remy  Division, Anderson, Ind.; gener-  ator assemblies .....	318,196
Independent Engineering Co., Inc.,  O'Fallon, Ill.; oxygen cylinders .....	829,309
Walter Kidde & Co., Inc., New  York; fire extinguishers .....	420,330
Leece Neville Co., Cleveland; gener-  ator assemblies .....	375,300

Nash Kelvinator Corp., Detroit;  propeller assemblies and spare  parts .....	19,503,878
Packard Motor Car Co., Detroit;  engine parts .....	17,726,233

### War Dept., Medical:

Acme Shear Co., Bridgeport,  Conn.; surgical instruments .....	\$3,361
Becton, Dickinson & Co., East  Rutherford, N. J.; hypodermic  needles, syringes, and syringe  needles .....	2,582
Clay-Adams Co. Inc., New York;  operating knives .....	4,146
Crosbie Co., Washington; lathes,  polishing .....	2,603

## TO PREVENT TIE-UPS



## STEEL PICKS PENOLA

● In the fight for fast production there's no place for a breakdown. With all our Forces eager for materiel—and all our efforts concentrated on delivering...there can be no risk of delay.

For Steel is the backbone of Defense. And with mills working at top speed, day and night—friction becomes a dangerous enemy. The terrible heats—the tremendous pressures—the terrific speeds...these call for lubricants that can really take it!

And Penola has proved to be the answer. So successfully have these tough products done their job that more Penola lubricants are produced and sold to the steel industry than any other make in the world.

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**I**F you are charged with production responsibilities, you'll want this new Euclid Catalog.

It illustrates and describes the design, functions and adaptability of the various cranes in this long established line.

Units of 1/2 ton to 100 tons capacity in spans up to 100 feet—

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## ORNAMENTAL

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## Complete Allocations Coming, OPM Man Said

*Chicago*

• • • Complete allocation of materials is on the way to take the place of the bogged-down priorities system, Lawrence Brown, in charge of civilian allocation of chemicals for OPM, told the Chicago section of the American Chemical Society. Brown echoed what is being heard with increasing fervor in the steel industry, that priority ratings are becoming practically useless, with low ratings being steadily pushed down to a point where they get little if any consideration. Low ratings seem to serve the only purpose of giving a fellow "a piece of paper and getting him out of the office," asserted Brown.

## New Order Granted To Aid Crane Makers

*Washington*

• • • Effective Nov. 1, a new preference rating order, P-5-b, has been granted by OPM to manufacturers of cranes and hoisting equipment employed on defense orders.

The old order P-5-a, under which a preference rating of A-1-a was granted, is modified by P-5-b so that the same rating is not granted to all manufacturers.

Exhibit A, contained in the order, is intended to serve as a guide in applying the rating. Suppliers also are limited so that the rating may only be used to expedite orders for material which is to be physically incorporated into the finished product, or into other materials listed.

## North American Opens Office For Subcontracting in East

• • • In order to facilitate development of Eastern sub-contracting work for the firm, North American Aviation will open an office in Cleveland, on Nov. 1. The company's purchases of outside labor, parts, and materials will reach an estimated total of \$100,000,000 for 1941, as compared with \$45,000,000 in 1940. Heading the Cleveland office will be Albert Gianelli.



## Lower Freight Rates to Pacific Coast Proposed

Washington

••• An 11 per cent average decrease in iron and steel freight rates affecting shipments exceeding 80,000 lb. on all-rail routes to the Pacific Coast was asked last week by OPM. Joining in this request directed to the Transcontinental Freight Bureau, Chicago, were the Army, Navy and the Treasury Department Procurement Division. Indicative of the slashes purposed are suggested cuts of from \$1.43 per 100 lb. to \$1.15 from Baltimore and from \$1.27 to \$1.10 from Pittsburgh. The Chicago rate would be reduced from \$1.10 to \$1.

Under the OPA steel price schedule as amended June 21, sellers were permitted to compute delivered prices in terms of the basing point price nearest the mill where the steel is produced.

Present rates range from \$1.43 per 100 lb. from Atlantic seaboard points to 85c. per 100 lb. from Colorado with minimum carload weights of 40,000 lb. and 60,000 lb., depending on the product. It was proposed to the railroads that the suggested rates and the existing rates be used alternatively, depending upon the minimum weight of the shipments per car.

## Daily Iron Output Lower in October

••• Production of coke pig iron (partly estimated) in October totaled 4,842,730 net tons, compared with 4,716,901 tons in September. October output on a daily basis decreased to 155,933 net tons from 157,230 tons in September. The rate of operations decreased 97.9 per cent of the industry's new capacity of 159,481 net tons of coke pig iron a month from 98.8 in September.

There were 214 furnaces in blast Nov. 1 compared with 216 on Oct. 1. Bethlehem Steel Co. blew in one of its Sparrows Point furnaces. The three furnaces blown out or banked were one Isabella, Carnegie-Illinois Steel Corp., one Palmerton, New Jersey Zinc Co., and one Pioneer of Republic Steel Corp.

**NUTS**

**CLARK**  
**PRODUCTS**

**FIT RIGHT INTO YOUR  
PLAN FOR ECONOMY**

Their quality, accuracy and uniformity save time, eliminate rejections and insure utmost satisfaction.

Send for latest catalog

**SCREWS**

**RIVETS**

**BOLTS**

1854

1941

MILDALE

**CLARK BROS BOLT CO.**

CONN.

**SPRINGS**  
*from*  
**Holly**

**FOR EVERY MECHANICAL NEED**

COIL SPRINGS   FLAT SPRINGS   LOCK SPRINGS  
SPECIAL SPRINGS   SNAP RINGS   WIRE SPECIALTIES   WIRE FORMS

We make springs from every type of wire up to and including three-eighths diameter. We pledge rigid adherence to your specification. Get our quotation on your next job.

**AMERICAN SPRING**  
AND MANUFACTURING CORP.  
Holly, Michigan

HERE LIES  
A GOOD TOOL  
THAT WAS  
SADLY ABUSED

## SAVE YOUR TOOLS *from an early death*



Save the tools from abuse and you save on production costs. After you have done a good job in tooling your machine tools, finish the good work with a good coolant pump. It will save your tools from an early grave.

Many builders and users of machine tools prefer the Gusher Coolant Pump with its variable delivery from a trickle to a flood. They like the packless, non-priming, non-clogging features of the Gusher Pump.

*The*  
**RUTHMAN**  
*Machinery Company*

1821 READING ROAD, CINCINNATI, OHIO, U.S.A.



### Revisions for The Iron

The following revisions should be made to THE IRON AGE Priorities Guide No. 2 which appeared in the issue of Oct. 23, to keep the guide up to date. These revisions are in addition to those published in THE IRON AGE, Oct. 30, p. 82.

Following revisions should be inserted in their proper place on page 4 in section entitled "L Orders."

L-6 — Restricts production of washers and ironers to Dec. 31, 1941. (10-29)

L-7 — Restricts production of non-mechanical ice refrigerators by limiting amount of steel available for such uses to 65 per cent of base period. (10-28)

Under "P Orders," page 3, list the following:

P-45—Material for fire fighting apparatus granted rating of A-2. (10-31)

P-68—Maintenance and repair supplies for steel industry granted preference ratings varying with item covered. (10-31)

L-2-b—Prohibits use of bright

### Priorities

Some of our customers are claiming that in place of actual priority certificates we must accept the following affidavit: "This is to certify that . . . lb. of . . . covered by our purchase order . . . is required for . . . order No. . . . which is covered by Preference Rating Certificate . . . dated . . . bearing an . . . preference rating. Due to the paper work involved in extending this rating, this sworn affidavit is submitted in lieu of an extension, the original of which may be examined at our office. (Signature)."

—New Brunswick (N. J.) firm.

OPM at New York advises that you should insist on a copy of the certificate or order.

May preference rating orders be reproduced?

—Massachusetts manufacturer.

According to the OPM at New York, all "P" orders—preference rating orders—may be reproduced either by photostating, offsetting, mimeographing or typing provided the identical wording and contents are used. In reproducing or making

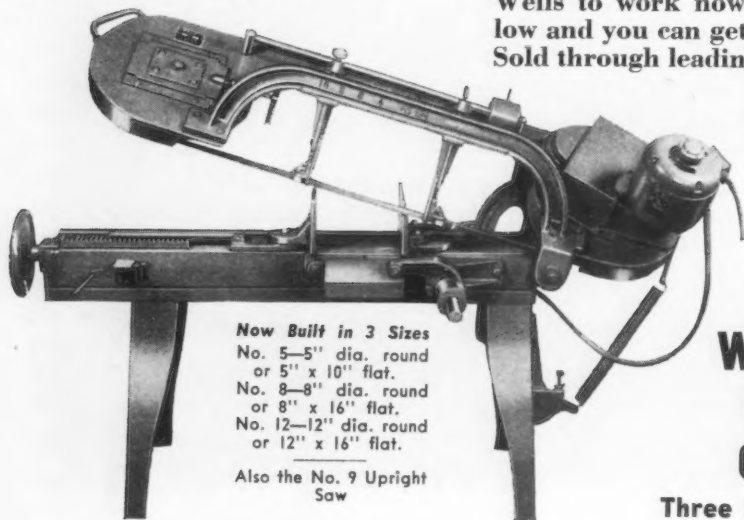
**Wells SAWS**  
THE TOOL OF SERVICE

*Here's the Saw  
you need  
TODAY!*

**PRODUCTION**—maintenance work—general utility—whatever the job, a Wells Metal Cutting Band Saw has a place in your plant. It quickly and accu-

ately cuts bars, tubes, sheets, and angles *anywhere in the shop*. It will speed up those 1001 odd jobs and smooth out the flow in your production line. Put a Wells to work now—the cost is low and you can get one quickly. Sold through leading mill supply

houses or  
write di-  
rect.



Now Built in 3 Sizes  
No. 5—5" dia. round  
or 5" x 10" flat.  
No. 8—8" dia. round  
or 8" x 16" flat.  
No. 12—12" dia. round  
or 12" x 16" flat.

Also the No. 9 Upright  
Saw

**WELLS  
MFG.  
CORP.**

Three Rivers, Mich.



### Age Priorities Guide

work containing aluminum, copper, nickel or chromium in passenger automobiles (10-27)

Add items below in their proper place in section "OPA Price Ceiling Affecting the Metal Working Industry" on page 7.

No. 38—Glycerine (10-28).

No. 36—Acetone and normal butyl alcohol (10-21).

Insert following in alphabetical index on pages 1 and 2.

Washers and ironers—L-6

Refrigerators—add L-7 to present listing.

Ironers—L-6

Automobiles — add L-2-b to present listing.

Glycerine—PS-38

Acetone—PS-36

Alcohol—add PS-36 to present listing.

In section entitled, "Forms to Use with Priority Orders," page 6, insert the following:

PD-99—Steel capacity and rolling schedules for November, to be filled out by producers.

PD-100—Steel capacity and rolling schedule report.

THE IRON AGE, NOV. 6

### Questions

copies for extension, the name of the producer, the address, the copy number and any and all other information given on the top of the first page must be included without change.

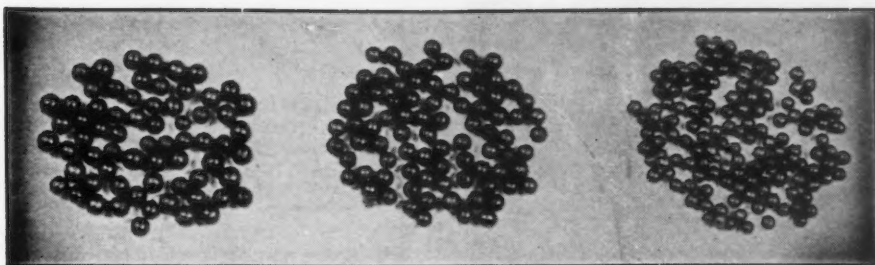
How do I get a supply of PD-3 blanks?

—Watervliet manufacturer.

The forms can be obtained only from the office of the Army, Navy or other government divisions for which the goods you are making are intended. Go to the nearest office of the department you are supplying. PD-3 is issued in serially numbered form and only when evidence is presented that an actual order has been obtained from a particular department of the government.

How does one apply for metals which are subject to allocation?

First, consult with your regular supplier, or with OPM. Chances are you will be advised to fill out form PD-1. If a reserve pool exists for the metal, applications for allocation from the reserve pool should be made on PD-20 (MM-1).



HEAT-TREATED STEEL SHOT

## We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

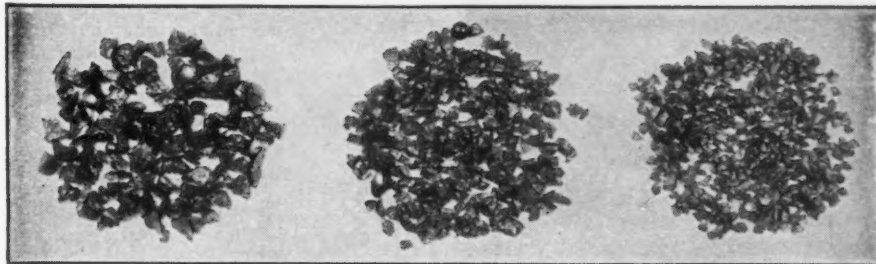
### Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

## HARRISON ABRASIVE CORPORATION

MANCHESTER, NEW HAMPSHIRE

HEAT-TREATED STEEL GRIT



## ... JESSOP'S WASHINGTON Carbon Tool Steel is First Choice

"Class" in a hunting dog is determined by breeding and training; "class" in carbon tool steel is determined by the experience of the steel maker and the care exercised in the various steps of manufacture.

Jessop's WASHINGTON straight carbon tool steel is our "special" grade made from the best raw materials and especially tested to assure freedom from the smallest flaws. The result is a tool steel of top ranking quality, suitable for use in the most costly tools and dies. Where the best carbon tool steel obtainable is required, specify WASHINGTON. Carried in stock at the Jessop mill in Washington, Pa., and at the Jessop warehouses in Chicago, Cincinnati, Cleveland, Detroit, Hartford, and Toronto.



**JESSOP STEELS OF AMERICA**  
**JESSOP STEEL COMPANY**  
General Offices and Works  
WASHINGTON, PENNA. U. S. A.  
CARBON · HIGH SPEED · SPECIAL ALLOY  
STAINLESS and COMPOSITE STEELS

Visit  
the Jessop Exhibit  
at  
Spaces 451 and 452  
18th Exposition of  
Chemical Industries  
Grand Central Palace  
New York  
Dec. 1-6, 1941



**takes care  
of servicing  
too!**

"In years of service, whenever a more snug fit of shaft is required, it is merely necessary to remove plate and peel off the shim laminations." So testify the manufacturers of this tool room engine lathe. Shafts in the gear box assembly must be loose enough to avoid hot shafts ...tight enough to insure proper gear meshing. LAMINUM turns the trick. • Shims (.002 or .003 in. thick laminations) cut to order at our factory. Stock shim materials for repair or maintenance work, obtainable from mill supply distributors.

**Laminated Shim Company**  
INCORPORATED  
76 Union St. Glenbrook, Conn.

Write for file-folder of shim application photos—and Laminum sample.

**LAMINUM**

THE SOLID SHIM THAT **peels** FOR ADJUSTMENT

1665

## THIS WEEK'S

### Priorities and Prices

Glycerine price ceiling established in Schedule No. 38 to become effective Nov. 10. Base maximum for crude glycerine set at 11½¢ a lb. (OPA:PM1451)

Non-mechanical ice refrigerator makers ordered to reduce steel consumption 35 per cent in period from Sept. 1 to Dec. 31, 1941, in order L-7. Tentative plans call for a continuation of this reduction through Aug. 31, 1942. (OPM:PM1452)

Preference orders P-3 and P-4, covering airframes and aviation engines and propellers have been extended to Dec. 31. New type order for the aircraft industry reported under study. (OPM:PM1443)

Washer and ironer production curtailed 17.3 per cent below average monthly sales for the 12 months ended June 30 in order L-6 issued Oct. 29. Order seen saving 32,000 tons of steel a year. (OPM:PM1453)

Milk can manufacturers granted preference rating of A-5 for materials and hot-dip tinned and tin plate dairy equipment makers given limited rating of A-5. Form PD-1 to be used in obtaining ratings. (OPM:PM1458)

Zinc pool for November set at 31 per cent of August production. Oxide pool put at 10 per cent. No dust is to be set aside for emergency use. T-31.

Cranes and hoisting equipment used for defense work granted preference rating dependent upon urgency of need of the crane, in order P-5-b which replaces P-5-a. New order differs in several respects from P-5-a. (OPM:PM1457)

Chlorinated rubber put under full priority control in order M-46 issued Oct. 29. (OPM:PM1455)

Waste paper price ceilings extended to cover 34 grades in amendment to price schedule No. 30. (OPA:PM1465)

Four more scrap dealers forced to make refunds on all amounts charged in excess of price ceiling since Sept. 2. (OPA:PM1469)

Forms PD-99 and PD-100, revised Oct. 23, being sent to steel producers for listing of November production and scheduled shipments.

Brass sheet, rod and tube makers agree not to raise prices without consulting OPA. This, it is said, will remove grounds for an increase in brass mill scrap prices. (OPA:PM1477)

Fire fighting apparatus makers granted preference rating of A-2 in order P-45 issued Oct. 31. (OPM:PM1480)

The iron and steel industry is being surveyed by OPM to study its operations under the priorities system. (OPM:PM1482)

Iron and steel industry granted preference ratings for repair and maintenance equipment in order P-68 issued Oct. 31. Ratings vary with type of material required. (OPM:PM1479)

Farm machinery and equipment rating plan, order P-33, extended to Nov. 30. Original order would have expired Oct. 31. (OPM:PM1490)

Zinc alloys to be placed under a formal price ceiling shortly. (OPA:PM1491)

An allocation program for steel is to be developed by OPM on request of SPAB. Priority ratings to be gradually dropped as allocation is adopted. (SPAB:SPA12)

Used steel drums to be placed under a price ceiling substantially below present levels. (OPA:T33)

★ ★ ★

For copies of above announcements address defense agency concerned, at Washington, giving announcement number as shown in parentheses after each paragraph (For example, OPM:PM1500 means announcement 1500 issued by Office of Production Management.)



# PERSONALS . . .

• **Charles A. Brewer**, since 1938 executive assistant to the head of General Electric's appliance and merchandise department at Bridgeport, has been appointed manager of distribution services succeeding **H. K. Smith**, who has been transferred to the general office at Schenectady. Mr. Brewer's first connection with General Electric was in 1923 as a member of the supply house section, predecessor to the present General Electric Supply Corp. Transferred to the accounting division in 1925, he became assistant to the auditor of the merchandise department at Bridgeport. In 1936 he was appointed secretary to the credit and service committee and was made assistant to the manager of the appliance and merchandise department in 1938.

• **K. C. Stevens** has been elected president of the Pittsburgh & Conneaut Dock Co., Conneaut, Ohio, and of the Pennsylvania & Lake Erie Dock Co., Fairport, Ohio, succeeding **Gordon S. Meek** who died last August. Following his graduation from Marietta College in 1925 and the Case School of Applied Science in 1928, he went with the Marietta Concrete Corp. as a mechanical engineer. In 1929 he became associated with the Pittsburgh & Conneaut Dock Co. as assistant master mechanic. He then became successively assistant to general superintendent, vice-president and superintendent and later assistant to the president and manager of the dock company.

**Clyde L. Ross** was made vice-president and will continue as auditor and assistant secretary. **George H. Bruce** was appointed assistant to the general superintendent.

• **C. H. Black**, vice-president in charge of sales of the American Can Co., New York, has been elected a director of the company. Mr. Black joined the American Can Co. in 1908 soon after his graduation from St. Lawrence University.

• **R. Russell Fayles**, until recently engineer at the South Chester Tube Co., Chester, Pa., has joined Lukens Steel Co., Coatesville, Pa., as combustion engineer in the

open hearth department. Mr. Fayles was graduated from the University of Alabama in 1936 and entered the employ of the Carnegie-Illinois Steel Corp. in the engineering department of the Vandergrift Works the same year. He later became assistant fuel and power engineer at this plant which position he held until January, 1941, when he joined the South Chester Tube Co.

• **P. G. Boyd** has been appointed district sales manager in the newly established Washington District of the Youngstown Steel Products Co., Youngstown, Ohio, with offices at 920 Shoreham Building.

• **Harold M. Lochrane**, a designing and operating engineer for more than 20 years, has recently joined the Kaydon Engineering Corp., Muskegon, Mich., where he will be in charge of methods and standards. Mr. Lochrane graduated from the University of Valparaiso in 1918 and enlisted in the aviation service. He entered development work soon after his discharge, and has been engaged in mechanical designing and engineering work ever since for Gary Tube Mill, White Motor Co., Liberty Motor Vehicle Co., Thompson Products and Ferry Cap & Set Screw Co.

• **L. T. Barnette**, who has been in charge of the plastics division of the Office of Production Management, Ordnance Branch, has been named editor of *Modern Plastics Magazine*. Mr. Barnette's active association with the plastics industry began in 1937 when he became the plant manager at Thermo Plastics, Inc., St. Clair, Mich., which subsequently became the Thermo Plastics division of Standard Products, Inc. Mr. Barnette will continue as advisory counsel to the plastics division of the OPM.

• **Howard P. Faust**, president of the R. G. Wright Co., Inc., of Buffalo, has been appointed by the OPM to participate in the organization of a milk machinery unit in its Civilian Supplies Division. In his new post, Mr. Faust will be in charge of distribution and allocation of materials used in the

manufacture of milk plant equipment.

• **C. A. Heil**, district sales manager for the Carpenter Steel Co., at Cleveland, has announced his retirement after completing 32 years of active service with the company in the Cleveland territory. For the past 25 years, he has held the position of district sales manager. **James S. Bailey, Jr.**, who for 13 years has been associated with Mr. Heil on the Cleveland sales staff of the Carpenter Steel Co., succeeds to the position of district sales manager.

• **William H. Bennett**, small tools representative in western New York State for the Brown & Sharpe Mfg. Co., Providence, and later for Brown & Sharpe of New York, Inc., retired after 43 years of active service.

• **Robert H. Bahney** has been promoted from chief engineer of the Central Alloy District of Republic Steel Corp., with headquarters in Canton, to assistant chief engineer for the corporation, with headquarters in Cleveland. He has been connected with Republic and its predecessor companies since 1915. **Eugene W. Phillips**, who has been Mr. Bahney's assistant, succeeds him as Central Alloy District engineer. Mr. Phillips served several months in the Engineering Corps of the Army during 1918 and has been with Republic and its subsidiary companies since 1921.

• **R. A. DeVlieg**, former general works manager of the Nash Motors division of the Nash-Kelvinator Corp. at Kenosha, Wis., has been elected vice-president of the corporation in charge of all Wisconsin operations. Other changes at Nash Motors include the appointment of **N. E. Wahlberg**, vice-president to be head of a newly formed research engineering division with **Meade Moore** as chief research engineer. **Floyd Kishline** will be new chief engineer to replace Mr. Moore.

• **W. R. McConnell**, formerly director of purchases for the Aluminum Co. of Canada and its affiliated companies, is now associated with the Tube Reducing Corp.,

Wallington, N. J., as assistant to the president.

• **R. M. Roberts**, formerly assistant general manager of sales, packers can, has been appointed manager of sales, Atlantic division of the American Can Co., New York, in a reorganization of both packers can and general line sales. **H. H. Howry**, formerly district sales manager, Atlantic district, packers can, has been named assistant sales manager of the Atlantic division. **F. G. Jewett**, heretofore assistant to Atlantic district manager, general line, has been made, with **T. E. Alwyn**, assistant sales manager of that division. Appointments in the Central division include: **J. J. Lynch**, assistant to the vice-president; **H. A. Pinney**, manager of sales, and **L. W. Graaskamp** and **M. J. Eberhart**, assistant managers of sales.

• **I. J. Kaar** has been appointed managing engineer of the receiver division of the General Electric radio and television department, Bridgeport, Conn. Mr. Kaar had been designing engineer of the division since November, 1934.

• **W. B. Simons**, Charlotte, N. C., has been appointed representative for Cochrane Corp., Philadelphia, flow meters in North and South Carolina.

• **Charles H. Armstrong** has been appointed assistant district manager of the Michigan sales territory of the Clark Controller Co., Cleveland.

• **James P. Gill**, chief metallurgist of the Vanadium-Alloys Steel Co., Pittsburgh, has just been appointed to the Advisory Committee on Metals and Minerals to the National Academy of Science and National Research Council.

• **John C. Garand** of the Springfield, Mass., Armory, inventor of the semi-automatic rifle bearing his name, has received a medal and certificate of recognition for "valuable contribution to national defense," from the American Society for Metals in Philadelphia.

• **J. K. Findley** and **G. M. Butler** of the metallurgical department of Allegheny Ludlum Steel Corp.'s Dunkirk, N. Y., plant addressed the Philadelphia chapter of the

American Society for Metals on the subjects of die steel and stainless steel respectively.

• **John T. Pheatt** has resigned as advertising manager of Walker-Turner Co., Inc., Plainfield, N. J. He is temporarily succeeded by **Walter Antener**.

• **Claude McClanahan**, chief electrician of the Chrysler Corp., has been inducted as president of the Industrial Electrical Engineering Society in Detroit. **Dale Douglass**, Chevrolet Gear & Axle division of General Motors Corp. is vice-president.

• **Joseph Q. Mecum**, who has been assistant works auditor at the Gary Works of Carnegie-Illinois Steel Corp., Pittsburgh, since 1939, has been made works auditor succeeding **A. M. Roberts**, who has retired. **Myron W. Krueger**, assistant works auditor since August, 1941, has been named senior assistant works auditor and **Ernest R. Oliver**, assistant local auditor for the past 13 years, becomes assistant works auditor. **Arthur E. Dieckmann**, who has been on the works auditor's staff since 1939, has been made assistant to works auditor.

• **W. J. Sampson, Jr.**, has been appointed general manager of sales of the Steel & Tubes division of Republic Steel Corp., Cleveland, to succeed **L. W. Harston**, who has resigned.

• **Robert Grant** has joined Young Radiator Co. of Racine, Wis., in a production and managerial capacity. Mr. Grant was educated at Cornell University and received his early production training as a line superintendent for the Nash Motors division of Nash-Kelvinator Corp. at Kenosha and Racine, Wis. He later served as executive vice-president of the Fuller-Johnson Corp., Detroit, and its subsidiaries. Mr. Grant leaves this position to go with Young Radiator Co.

• **Fay Aller** has been named director of research, and **Albert Wartinger** has been appointed chief engineer of the Sheffield Corp., Dayton, Ohio. Mr. Aller was chief engineer of the Gage & Machine Tool division and has been with the company for eight years. Mr. Wartinger was chief engineer of the Tool & Die divi-

sion and has been with Sheffield for 15 years.

• **E. C. Bolton** has been appointed manager of the Cincinnati district sales office of Cutler-Hammer, Inc., Milwaukee. Mr. Bolton has been with the company since his graduation from Carnegie Institute of Technology in 1922. In 1925, after three years in the engineering and sales departments, he took over public utility sales in the Chicago district. Shortly afterward, his territory was expanded to include the entire Middle West and in 1935 to include the whole country.

• **W. C. Griffin** has been named assistant manager of port traffic by the Car Service division of the Association of American Railroads. He will be in charge of Pacific Coast ports with headquarters at San Francisco. Mr. Griffin entered railroad service in 1901 with the Southern Railway and served in the operating and traffic departments of that and other railroads. He became connected with the Car Service division of the Association of American Railroads in 1923 and served as district manager in various cities. More recently, he has been temporarily assigned to special duties in the Washington office of the Car Service division.

• **Brig. Gen. William S. Wood**, of the Wisconsin National Guard and vice-president and general manager of the Beloit Iron Works, Beloit, Wis., has tendered his resignation to the War Department so that he may return to his job which will involve increasing production on a number of defense contracts.

• **Frank J. Tharinger**, Milwaukee business man and banker, has been appointed manager of the newly opened Milwaukee branch of the OPM with headquarters in the First Wisconsin Bank building.

• **C. G. A. Rosen**, assistant chief engineer of the Caterpillar Tractor Co., Peoria, Ill., discussed New Trends in Diesel Engine Development and Design before the Milwaukee section of the SAE at its recent dinner meeting.



## OBITUARY . . .

• **Allyn F. Harvey**, former president of the Pittsburgh Steamship Co., died in Cleveland, Oct. 22, aged 70 years, following a short illness. In 1894 Mr. Harvey became associated with Pickands, Mather & Co., Cleveland, then went to Pittsburgh Steamship Co. in 1901. He was assistant general manager of the company from 1904 until 1916 when he became vice-president. In 1924 he was elected president and has been retired since December, 1940.

• **Wallace W. King** of Clifton, N. J., and vice-president of the Industrial Marketers of New Jersey, chapter of National Industrial Advertisers Association, died Sunday, Oct. 19, at Hackensack Hospital of injuries sustained in an automobile accident at Lodi, N. J. Mr. King, head of Wallace W. King Advertising Agency, Clifton, N. J., was born at Binghamton, N. Y., and has been active in industrial advertising circles in New Jersey for a number of years. He was 26 years old.

• **Paul F. Reichhelm**, president of the American Swiss File & Tool Co., Elizabeth, N. J., died on Oct. 3, after a long illness. Mr. Reichhelm had been associated with the company ever since it was founded by his father, Mr. E. P. Reichhelm, in 1900, and succeeded his father as president in 1916.

• **Lewis J. Frost**, vice-president and treasurer of the Norman Boosey Mfg. Co., Detroit, died Oct. 20.

• **John Dillon**, vice-president of the Keokuk Electro-Metals Co., Keokuk, Iowa, died recently.

• **Joseph Insull**, for 25 years assistant manager of the General Electric Co., Pittsfield, Mass., plant, died at his home in Springfield, Mass., Sunday, Oct. 12. He was born in London, England, 83 years ago. At the beginning of his career he was associated with the General Incandescent Arc Lamp Co., New York, subsequently purchased by the General Electric Co. and merged with the Stanley Company, Pittsfield. He retired in 1928.



MISS GEMMA RICCIARDI  
*Associate Editor, The Iron Age*

• • • **Miss Gemma Ricciardi**, associate editor of THE IRON AGE, died Oct. 28, after a brief illness. She was educated at Hunter College, New York City, graduating with a B.S. degree, and she followed her formal education with several years of post-graduate work in Business Administration at New York University.

Gemma Ricciardi came with THE IRON AGE in 1923 as a stenographer. Her marked abilities resulted in her being progressively drawn into various editorial duties, and in 1932 she became personal secretary to John H. Van Deventer, editor of THE IRON AGE. In 1934 she was appointed associate editor, the first and only woman to occupy that post in the 86-year history of THE IRON AGE.

She was a woman of unusual talents—she combined a charming personality with an unusually alert, able mind. She was steadfast, a tremendous worker, and had accumulated an encyclopedic knowledge of the field served by THE IRON AGE.

In the death of Miss Ricciardi, THE IRON AGE organization has experienced a severe blow. She was the rare type of person, who by sheer ability and force of personality, becomes the very center around which an entire department revolves. Every member of THE IRON AGE is conscious of having lost a true friend, and the organization itself has suffered an irreparable loss.

# CONSTRUCTION STEEL

. . . STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

## Reinforcing Steel

Awards of 6750 tons; 5945 tons in new projects.

### AWARDS

#### ATLANTIC STATES

2000 Tons, Philadelphia, Philadelphia Electric Co. power station, to Bethlehem Steel Co., Bethlehem, Pa.  
600 Tons, Washington, Pennsylvania Rail-

road mail shed, to American Steel Engineering Co.; McCloskey & Co., contractors.

500 Tons, Boston, Navy Yard buildings Nos. 199 and 131 improvements, to Concrete Steel Co., Boston, through Thomas O'Connor & Co., Boston, contractors.

315 Tons, Newport, R. I., Naval training station, to Truscon Steel Co., Youngstown; through Ford, Bacon & Davis.

200 Tons, Pawtucket, R. I., bridge, to Bethlehem Steel Co., Bethlehem, Pa.; M. A. Gaminino, contractor.

200 Tons, Armstrong County, Pa., highway project B-03087, section 1, to Bethlehem Steel Co.; N. R. Corbisello, contractor.

200 Tons, Hagerstown, Md., Fairchild Aviation Corp. factory, to Bethlehem Steel Co., Bethlehem, Pa.; Price Construction Co., contractors.

150 Tons, Portsmouth, N. H., Navy Yard prison, to Truscon Steel Co., through Fox Steel Co.

150 Tons, Springfield, Mass., American Bosch Corp. factory, to Joseph T. Ryerson & Son, Inc., Boston; Brown & Mathews, contractors.

125 Tons, mesh, Berlin-Newington, Conn., State road, to American Steel & Wire Co., Worcester, Mass.

116 Tons, Centre County, Pa., highway project R-219, section 7, to Bethlehem Steel Co., Bethlehem, Pa.; H. J. Williams, contractor.

### THE SOUTH

400 Tons, Alabama City, Ala., No. 2 blast furnace for Defense Plant Corp., to Truscon Steel Co., Youngstown, through Rust Engineering Co.

100 Tons, Little Rock, Ark., Arkansas ordnance plant, to Truscon Steel Co., Youngstown, through Ford, Bacon & Davis.

### CENTRAL STATES

750 Tons, Des Moines, Iowa, small arms plant addition, to Inland Steel Co., Chicago.

500 Tons, Kingsbury, Ind., ordnance plant addn., to Bethlehem Steel Co., Bethlehem, Pa.

200 Tons, Scott Field, Ill., U. S. Engineers, 1103-42-91, to Laclede Steel Co., St. Louis, Mo.

130 Tons, Dubuque, Iowa, addition Dubuque Packing Co., to Bethlehem Steel Co., Bethlehem, Pa.

111 Tons, Rockford, Ill., addition to John Barnes plant, to Truscon Steel Co., Youngstown, through A. Jackson Co.

### PENDING REINFORCING BAR PROJECTS

#### ATLANTIC STATES

400 Tons, Washington, Hotel for Women, J. W. Harris Associates, contractor.

125 Tons, Portsmouth, N. H., carbide storage building for Navy.

100 Tons, Naugatuck, Conn., government plant to be operated by U. S. Rubber Co.

### THE SOUTH

300 Tons, Alexandria, Va., Atlantic Utility Service Co. power station.

### CENTRAL STATES

1000 Tons, Grand Blanc, Mich., Fisher Body Co. tank plant.

900 Tons, Pontiac, Mich., Pontiac Motor Co. Gun Plant.

730 Tons, Granite City, Ill., Granite City Steel Co. expansion.

600 Tons, Fort Wayne, Ind., General Electric Co. supercharger plant, Stone & Webster Engineering Co., contractor.

600 Tons, Kansas City, Mo., Pennway viaduct; bids due Nov. 18.

### NEWFOUNDLAND

1000 Tons, Newfoundland, Army base requirements, Newfoundland Base Contractors.

### CANAL ZONE

187 Tons, Panama Canal, Schedule 5645, Req. 29854-A; bids taken.

## Fabricated Steel

Lettings drop to 6900 tons from 13,925 tons; new projects of 20,650 tons are almost double those of a week ago.

### AWARDS

#### NORTH ATLANTIC STATES

660 Tons, Weehawken, N. J., ventilation building, Lincoln Tunnel for New York Port of Authority, to American Bridge Co., Pittsburgh.

200 Tons, Buffalo, plant addition for Hanna Furnace Corp., to Ernst Iron Works, Buffalo.

150 Tons, Buffalo, plant addition for Houde Engineering Corp., to R. S. McMannus Steel Construction Co., Inc., through

**CLOSE CONTROL** to give you *Better Springs Quicker!*

CAREFUL, constant, supervision of every detail of production plus painstaking inspection of every order assures you of the fastest possible delivery of Accurate Springs . . . with no compromise in quality and accuracy.

We're correlating time, men, machines and materials to give you what you want when you want it. You'll like this kind of service — it saves time, money and headaches. Let's talk it over.

**Accurate Springs**

ACCURATE SPRING MFG. CO. 3819 W. Lake St., Chicago, Ill.  
SPRINGS • WIREFORMS • STAMPINGS



## CONSTRUCTION STEEL

Charles Berrick Sons Co., both Buffalo, general contractor.  
100 Tons, Hingham, Mass., two storage buildings for government, to Groisser & Schlager Iron Works, Somerville, Mass.

### THE SOUTH

- 590 Tons, Ducktown and Farner, Tenn., radial gates for spillway, Ocoee No. 3, dam, for TVA, to American Bridge Co., Pittsburgh.  
500 Tons, New Orleans, warehouse and factory building for city, to Jones & Laughlin Steel Corp., Pittsburgh.  
382 Tons, Grenada, Miss., bridge for Illinois Central System, to American Bridge Co., Pittsburgh.

### CENTRAL STATES

- 3000 Tons, Toledo, factory building for American Propeller Co., to Joseph T. Ryerson & Son, Inc., Chicago.  
565 Tons, Cleveland, Bulkley Boulevard grade separation, to American Bridge Co., Pittsburgh.  
385 Tons, Duluth, Minn., coke and ore bins for Interlake Iron Corp., to American Bridge Co., Pittsburgh.  
225 Tons, Philo, Ohio, extension to coal handling equipment, Philo plant, for Ohio Power Co., to American Bridge Co., Pittsburgh.  
180 Tons, various locations, bridge caps for Northern Pacific Railroad Co., to American Bridge Co., Pittsburgh.

### PENDING STRUCTURAL STEEL PROJECTS

#### NORTH ATLANTIC STATES

- 2200 Tons, Lackawanna, N. Y., blast furnace for Bethlehem Steel Co.  
1625 Tons, Kearny, N. J., Hackensack River lift bridge for Central Railroad of New Jersey.  
1610 Tons, Brooklyn Navy Yard testing laboratory.  
335 Tons, Philadelphia Navy Yard buildings Nos. 607 and 625.  
305 Tons, Post Creek, N. Y., State highway bridge PSC-7263.  
280 Tons, Pittsfield, Mass., extension to building No. 14 for General Electric Co.  
185 Tons, Long Island, laundry building, Sunnyside Yard for Pennsylvania Railroad.  
130 Tons, Farmingdale, N. Y., hangar for Fairchild Engine & Air Corp. Ranger Air Engine Division.

### THE SOUTH

- 910 Tons, Bracey, Va., Roanoke River bridge for Seaboard Air Line.  
425 Tons, Delta, S. C., Tiger River bridge for Seaboard Air Line.

### CENTRAL STATES

- 2810 Tons, Stickney, Ill., pump and blower house, west sewage works, for Chicago Sanitary District.  
1950 Tons, Kansas City, Mo., superstructure main viaduct, Trafficway project.  
1490 Tons, Wichita Falls, Kan., camouflage building and hangar for Boeing Airplane Co.  
680 Tons, Louisiana, Mo., power house, Missouri ordnance works for Defense Plant Corp.  
560 Tons, Lima, Ohio, addition to Buildings A and B, for Westinghouse Electric & Mfg. Co.  
360 Tons, various locations, Bridges for Missouri Pacific Railroad.  
210 Tons, Allegan, Michigan, Kalamazoo River State bridge.  
135 Tons, Wexford Co., Mich., Manistee River State bridge.  
115 Tons, Flint, Mich., store building for J. C. Penney Co.

### WESTERN STATES

- 2350 Tons, Oakland, Cal., three dry provision warehouses for Navy.  
1590 Tons, Odair, Wash., penstock coaster gates, Specification 1010, Grand Coulee dam.  
390 Tons, Bremerton, Wash., shaft forging shop, Puget Sound Navy Yard.

## Weekly Bookings of Construction Steel

Week Ended	Nov. 3, 1941	Oct. 28, 1941	Oct. 7, 1941	Nov. 4, 1940	Year to Date	
	1941	1941	1941	1940	1941	1940
Fabricated structural steel awards.	6,900	13,925	8,400	32,300	1,130,020	986,111
Fabricated plate awards.	0	15,015	0	1,780	120,640	127,710
Sheet steel piling awards.	0	1,500	0	175	26,760	65,180
Reinforcing bar awards.	6,750	6,100	11,855	5,000	635,480	402,310
Total letting of Construction Steel.	13,650	36,540	20,255	39,255	1,912,900	1,581,311

## Cast Iron Pipe

Sanitary Water District No. 2, Washington

County, Bristol, Va., plans pipe lines for water system in area covered by district, including main line from White Top Mountain.

# UDYLITE



## Headquarters

### for ELECTROPLATING, POLISHING AND ANODIZING INFORMATION

For prompt, dependable metal finishing information, call on Udy-lite. No organization is better equipped to give you information gained from installing plating, polishing and anodizing departments in many leading manufacturing plants throughout the country.

Trained plating engineers and electrochemists are at your service. These men know metal finishing and they can help you plan a new installation or revise your present one for greater efficiency. They know, also, that you want information quickly.

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equipment . . . second to none in terms of quality and efficient performance.

and supplies . . . for every metal finishing need. Salts, acids, anodes, buffing and polishing materials—everything required. Call Udy-lite for prompt service on your finishing requirements. You pay no more for Udy-lite dependability.

1 Laboratory where efficiency of Udy-lite finishing processes is maintained by constant control. 2 Design and layout department where clients may obtain the advice of experienced metal finishing engineers. 3 Laboratory where all Udy-lite products are tested under actual plant conditions.

## THE UDYLITE CORPORATION

1651 E. Grand Blvd., Detroit, Mich.

New York  
60 E. 42nd Street

Chicago  
1943 Walnut Street

Cleveland  
3756 Carnegie Ave.

## CONSTRUCTION STEEL

Cost about \$150,000. Bond issue in that amount has been authorized.

**Christopher, Ill.**, plans pipe line extensions and replacements in water system, including additional reservoir facilities. Cost about \$50,000. Financing is being arranged through Federal aid.

**San Luis Obispo, Cal.**, plans pipe line extensions in water system; also will build a new reservoir. Surveys and estimates of cost will be made by W. C. Hammatt, 456 South Kenmore Avenue, Los Angeles, consulting engineer.

**Clearfield, Utah**, plans pipe line extensions and improvements in water system and other waterworks installation. Cost about \$44,000, of which \$29,000 will be secured through Federal aid.

**Water Department, Birmingham**, plans pipe line extensions and improvements in water system, and other waterworks installation. Special election has been called Dec. 15 to vote bonds for \$130,000 for project.

**General Purchasing Officer, Panama Canal, Washington**, asks bids until Nov. 12 for cast iron water pipe (Schedule 5685).

### Pipe Lines

**Continental Pipe Line Co.**, Eagle Ford Road, Dallas, Tex., an interest of Continental Oil Co., same address, plans 4-in. welded steel pipe line from Ross oil pool, near Jolly, Tex., to connection with main pipe line system, about 22 miles, for crude oil transmission. Cost close to \$100,000 with booster station and other operating facilities.

**United States Engineer Office, Postoffice and Courthouse Building, Cincinnati**, closes

bids Nov. 8 for 10 sections of electrically-welded steel discharge pipe, each section 60 ft. long (Circular 51).

**Morgan City, La.**, has plans for steel pipe lines for municipal gas distributing system, including main welded steel line from Bate-man Lake gas field, near Berwick, source of supply, to city, with control station, meter house and other operating facilities. Cost about \$246,000. Special election has been called Nov. 25 to approve bond issue in that amount. T. Baker Smith, Houma, La., is consulting engineer.

**Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J.**, asks bids until Nov. 12 for 5000 ft. of welded black steel pipe; also for 1000 ft. of 3/4-in. brass pipe (Circular 869).

**United States Engineer Office, Los Angeles**, has let contract to Flotation Systems, Inc., 4031 Goodwin Avenue, for pipe line system for gasoline fueling at Muroc bombing range, Muroc Lake, Muroc, Cal., including bulk station and other operating facilities, at \$81,652. Company also has secured contract from War Department for a similar system at basic flying school, Enid, Okla., at \$52,927.

**Gulf Oil Corp.**, Gulf Building, Houston, Tex., plans new 8-in. welded steel pipe line from Sand Hills oil field, Crane County, Tex., to Crane, about 18 miles, where connection will be made with present pumping station and main pipe line system. Also will build pipe line gathering system in oil field noted, totaling about 23 miles, and will construct bulk station consisting of two 80,000-bbl. steel tanks, connecting with two new pumping plants. Capacity of bulk station at Crane will be increased with new 80,000-bbl. steel tank.

### Financing Arranged for Granite City Expansion

Washington

••• **The Defense Plant Corp.** last Thursday announced a \$6,300,000 lease agreement with the Granite City Steel Co., Granite City, Ill., for the construction of three 125-ton open hearth furnaces to produce 300,000 tons of ingots and the revamping of a strip mill to provide increased production of 190,000 tons of plates annually.

The Defense Plant Corp. approved lease agreements with the following:

**Copperweld Steel Co., Warren, Ohio**—an increase from \$4,000,000 to \$4,600,000 in the previous commitment to permit additional facilities for annealing alloy steel bars. Estimated capacity of the new facilities will permit treatment of 36,000 tons of steel annually.

**National Supply Co., Pittsburgh**—\$273,536 for a plant at Torrance, Cal., for production of aircraft parts for the Navy.

**Vickers, Inc., Detroit**—\$8,590,957 for constructing and equipping a plant at Detroit for turning out Army aircraft equipment. The commitment is in addition to a previous authorization for \$1,436,721 for aircraft production and ordnance equipment production in Detroit.

**Aetna Ball Bearing Mfg. Co., Chicago**—\$410,565 for machinery and equipment to be installed at Chicago for the production of Army aircraft equipment.

**Curtiss-Wright Corp., Curtiss Propeller Division**—an increase in the existing lease agreement from \$1,769,600 to \$1,885,600 for additional aircraft producing facilities at Caldwell, N. J.; and an increase from \$7,099,650 to \$8,991,150 in the existing lease arrangement covering facilities for aircraft equipment production at Indianapolis, Ind.

**Avondale Marine Ways, Inc., Westwego, La.**—\$116,000 for the installation of naval shipbuilding machinery and equipment.

**Babcock & Wilcox Tube Co., Beaver Falls, Pa.**—\$969,050 for necessary facilities for the production of alloy steel ingots. Of this amount, \$710,550 will go for annealing and tubing facilities, and \$258,500 for electric furnace capacity and other equipment. New facilities will have an estimated annual capacity for producing 18,000 tons of alloy steel and for treating 21,600 tons.

**Electronic Mechanics, Inc., Paterson, N. J.**—\$98,120 for construction and equipment for producing Army radio equipment.

The RFC also announced it had made a \$32,500 defense loan to the Pittsburgh Die & Casting Co., Swissvale, Pa.; a \$100,000 loan to the Dixie Machinery Mfg. Co., St. Louis; and a \$98,500 loan to Watts Electric & Mfg. Co., Detroit.

### Hackett Quits OPM

Washington

••• **S. E. Hackett** has resigned as deputy chief of the OPM Iron and Steel Branch, effective Nov. 1.

## SHOP BOXES



For Immediate Shipment

No. 601—10"x16"x6"—18 Gauge—95¢

No. 602—12"x18"x8"—16 Gauge—\$1.25

F.O.B. Factory, Phila., Pa.

An ideal all purpose shop box. Two heavy steel runners provide a **POSITIVE STACKING LOCK**. Re-enforced at point of maximum wear.

Electrically welded — sturdy construction with rigid handles and hook holes at each end.

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1516 GERMANTOWN AVENUE, PHILADELPHIA, PA.



# NON-FERROUS METALS

... MARKET ACTIVITIES AND PRICE TRENDS

## Zinc Alloy Schedule

### Issued: Pool is 31%

... A scheduled of proposed maximum prices for zinc alloys, ranging from 11½ to 12c. a lb., was established by OPA on Nov. 1. An official schedule of maximum prices on rolled zinc products, including sheet, strip, and plates, as well as the alloys will be issued by OPA as soon as costs and earnings investigations are completed, it was announced. The schedule on zinc alloys made from high grade zinc sets a maximum delivered prices of 11½c. a lb. for carload lots, 11¾c. a lb. for lots from five tons to a carload, and 12c. a lb. for less than five ton lots.

With the exception of the price schedule on sheets, strip, and plates which will be announced shortly, all zinc products are now under an upward adjusted price schedule. Zinc is the first metal to receive higher price ceilings, but it is expected that OPA investigations of costs and earnings in the production of other non-ferrous metals will bring about similar upward price ceiling adjustments. Such adjustments, when they are made, are expected to bring about higher production, especially in lead.

OPM announced November zinc pool requirements as follows: producers of metallic zinc will set aside an amount equal to 31 per cent of their August production, zinc oxide pool requirements to equal 10 per cent of August production, and no zinc dust need be set aside for pool purposes. This order is effective Nov. 1. The 31 per cent pool for metallic zinc totals about 23,412 tons, while for the past three months the pool has amounted to 27 per cent. Zinc producers estimate that some 55,100 tons will be shipped to customers in the regular manner.

In spite of the 1c. a lb. increase in the price of primary zinc, important in the production of brass, leading manufacturers of brass sheet, rod, and tube have agreed not to raise their prices without first consulting OPA, thus "co-

operating with our efforts to prevent any inflationary trend from developing in the prices of brass sheets, rods, and tubes," said Henderson, OPA head. Unchanged prices for these products removed any grounds for a price increase in brass mill scrap, OPA indicated. It is reported that some fabricators have been hoarding scrap in expectation of higher prices.

Movement of copper scrap has grown steadily smaller since the OPM priority order went into effect Oct. 1. Six refiners report an intake for the week ended Oct. 25 of 333 tons, and only 1673 tons for the first 25 days of the month. Since about 140,000 tons of new copper goes into consumption monthly, it would be expected that refiners could obtain at least 3,000 tons a week or about 12,000 tons a month.

Increased lead imports are easing the effects of the domestic shortage according to reports from the American Bureau of Metal Statistics. Lead content of ore and matte imports increased during August to 17,980 tons from only 6045 tons in July. The bulk of these imports came from Newfoundland and Australia, with some ore moving in from Mexico and Canada. Base bullion imports rose to 3220 tons from 1042 in July, all from Mexico, while August pig and bar lead imports were up to 32,451 tons from only 11,617 tons in July. Canada, Mexico, Peru, and Australia shipped the pig and bar lead to this country. November allocations of lead were released by MRC during the past week.

Interest in the tin market is focussed on Far Eastern prices, which have, for about the past month and a half, remained as high or higher than the ceiling price that importers are allowed to charge domestic consumers. There is no change in the market situation either current or anticipated, and wholesale sellers are being forced to stay out of the market because Straits tin cannot be bought at the source of supply at a price that permits business in the American market.

## Non-Ferrous Prices

(Cents per lb. for early delivery)

Copper, Electrolytic <sup>1</sup>	12.00
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis <sup>2</sup>	8.25
Lead, St. Louis <sup>3</sup>	5.70

<sup>1</sup> Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. <sup>2</sup> Add 0.39c. for New York delivery. <sup>3</sup> Add 0.15c. for New York delivery.

## Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 15c.-17c. a lb.; No. 12 remelt No. 2, standard, 16c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb. New York: American, 13c. a lb., f.o.b. smelter. QUICKSILVER, \$195 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 13.25c. a lb.

## Dow Offers Substitute For Nickel, Copper, etc.

Midland, Mich.

... Saran, a flexible, semi-transparent plastic, manufactured by Dow Chemical Co., is available to industry as an alternative for copper and other metal tubings, the company announced shortly after all copper was put under strict allocation by a ruling of OPA. The material has been tested and proved suitable to replace such strategic materials as nickel, stainless steel, copper and ceramics, according to the company. It is tough and resistant to moisture, brines, solvents, acids and alkalis. It can be used for short periods at temperatures of 250-275 deg. F. although strength and resistance are somewhat lowered at elevated temperatures.

The material, available in tubes of ⅛ in. to 5/16 in. outer diameter, with wall thickness ranging from 0.030 to 0.062 in. The tubing can be joined by Parker standard tube couplings and SAE or other flare-type fittings. Equipped with "B" Parker standard tube couplings the tubing has withstood a pressure of 1500 lbs. per sq. in. Fatigue test results show that it withstands vibration and flexing better than copper tubing.

Mueller Brass Co., Port Huron, Mich., is developing fittings which will join the tubing without coming in contact with the fluid in the tubing.

# MACHINE TOOLS

... SALES, INQUIRIES AND MARKET NEWS

## 9 Billion Will Be Spent On Machinery, Equipment

Washington

••• In the Department of Commerce's publication "Domestic Commerce Weekly" of Oct. 30, it is estimated that producers expenditures for new machinery and equipment during the current year will approximate \$9,000,000,000, a total almost three times the annual average of \$3,300,000,000 during the last decade and comparing with \$5,600,000,000 recorded for 1929.

Typical of the broad demand is the expansion in foundry and machine shop products. Since June, 1940, approximately 190,000 new workers have been added to foundry and machine shop employment, compared with 143,000 in electrical machinery, 50,000 in engines and turbines, and 34,000 in machine tools.

Over the past fifteen months, the report states, shipments of all types of machinery have totaled about \$10,000,000,000 but despite this order backlogs for the industry are currently estimated at \$8,000,000,000.

\* \* \*

## Increase in Hours Planned

Chicago

••• Though men are not available so far to turn machine tool plants in this district loose on a seven-days-a-week schedule, efforts are being made to increase production hours as much as possible. In this line, manufacturers are wondering what will happen to prices, for labor will want double time for two extra days, and with ceiling prices on new machines most likely, costs will skip out of line.

Makers of new equipment are urging buyers to thoroughly scour the used field. Yet, used dealers report that their floors are loaded with usable machinery, but the demand is not there. They feel that aside from the natural inclination of a buyer to get a new piece if he can, that Washington has also led buyers to believe that there are no used machines available.

Allis-Chalmers has ordered most of the equipment for its new turbo

supercharger plant, for which ground has been broken. A. O. Smith has been buying steadily against huge defense orders of long standing. Orders still come regularly from the new Buick Aviation plant here, which incidentally expects to have a pilot line operating before the middle of the month. Deere & Co. is also in the market for additional equipment for its tank transmission program. Most of the buying in this section is on the basis of additions to original programs placed many months ago.

\* \* \*

## Shortage of Accessories Holding Up Machine Tools

Cleveland

••• A vicious circle of priorities and limited facilities for certain parts has tightened the neck in the machine tool bottleneck. This is particularly true so far as chucks, collets, motors and motor-generators are concerned, and quite a number of deliveries have been held up due to lack of sufficient of these items to permit fulfillment of high priority orders. The most unfortunate aspect of this is that the chuck manufacturers have expanded their capacities substantially, in one case actually tripling output, but further expansion is handicapped by the difficulty in securing the necessary equipment to increase capacity. To expand operations chuck manufacturers would require boring machines and turret lathes, both of which are in heavy demand for defense plants, so that chuck manufacturers would stand little chance of getting early delivery on these items.

A somewhat similar situation exists in certain types of screws which have held up delivery on lathes, drill presses and other vitally needed equipment, bearing A-1-a priority ratings. Meanwhile, the OPM continues to divert shipments of machinery originally promised in other directions. The most radical example of this is where within the past week a sizable piece of equipment was actually diverted at the loading platform.

In view of the OPA price ceilings on used equipment, recent auction sales of such materials have taken a rather comical aspect. In an auction held at Jackson, Mich., a short time ago the auctioneer had eight bidders willing to pay the OPA ceiling price—had them draw for the highest card in order to decide the one who was to be declared the highest bidder.

\* \* \*

## Price Ceiling in Offing

Cincinnati

••• Possibility of a ceiling on new machine tools arose last week when a representative group of manufacturers were called to Washington to discuss the situation. While no action has yet been taken, according to reports, further meetings in the near future are expected. In the meantime, manufacturers are bending efforts to expand further the already phenomenal tool output and hardly a week passes without some manufacturer finding nooks and crannies of his plant which can be further pressed into productive service. New business continues unabated although deliveries are still well extended, except on a few small tools capable of production line manufacture.

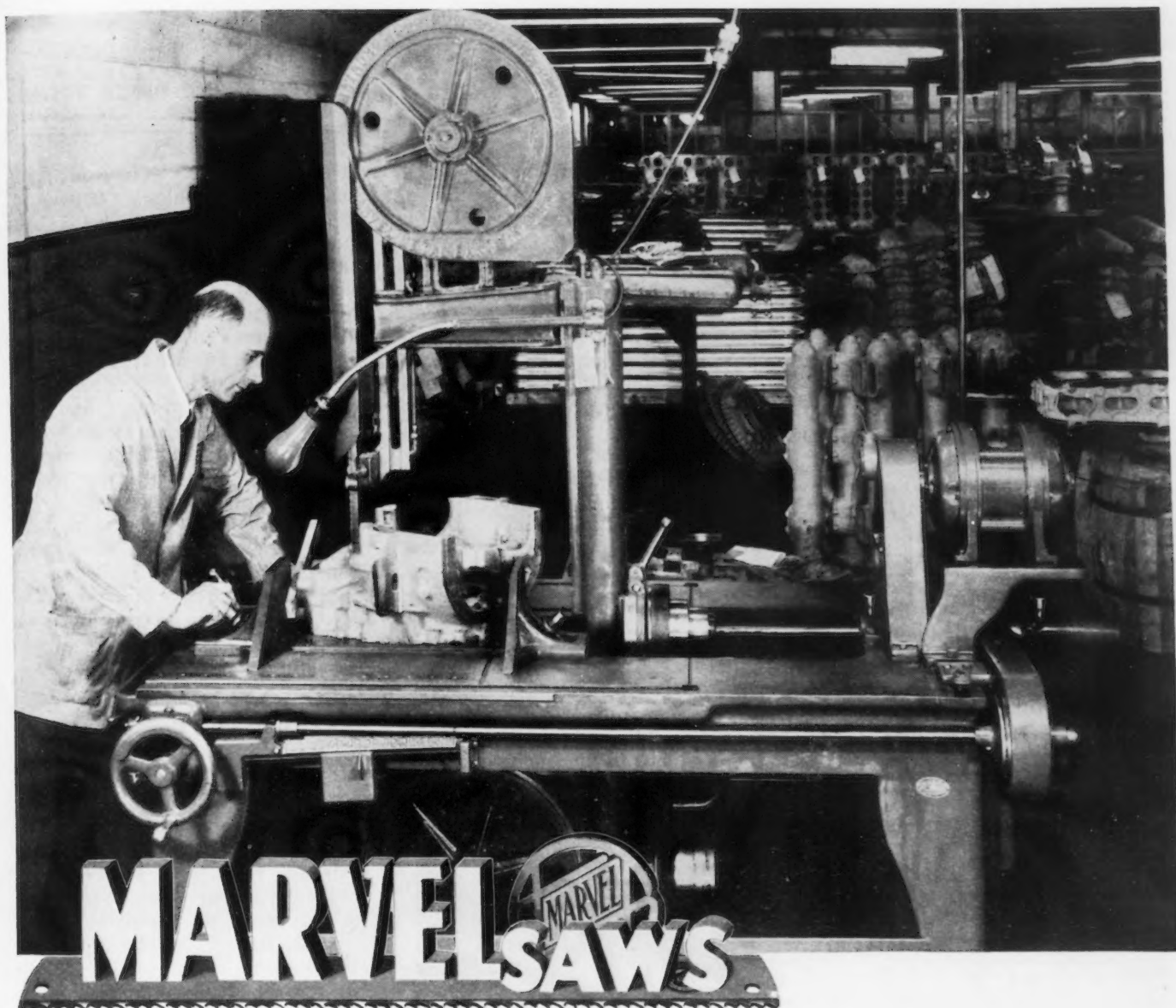
## 130 Primes, 146 Subs Engaged at St. Louis

St. Louis

••• As of Oct. 1, 130 firms have been engaged in prime contracts and 146 firms engaged in subcontracts in defense work in Metropolitan St. Louis, Frank J. McDevitt, district manager, division of contract distribution, OPM, here, told the Mississippi Valley Association and the Associated Industries of Missouri at a joint luncheon Oct. 28.

"Our organization has assisted 124 prime and subcontractors," he continued. "The dollar value of 'assists' by our organization during September amounted to \$3,885,675, covering 11 prime and 111 sub-contracts. The latter awards were largely under \$50,000 each.





Photograph courtesy Packard Motor Car Co.

## A MARVEL No. 8 Speeds All-out Production of Packard Rolls-Royce Aircraft Engines

MARVEL Sawing Machines are playing an important part in speeding production for National Defense. Not only the MARVEL 6A and 9A High-Speed Production Saws that automatically cut-off rifle barrels, gears and parts from bar stock in great quantities; or the giant MARVEL No. 18 Hydraulic Saw so well known for its cutting Speed; but all other MARVEL Saws, too, each in its own way, are at work in America's "all-out production." Take for example, the MARVEL No. 8 Universal Band Saw illustrated above, working on aircraft engine crankcases in the "D" Division of the new Packard Rolls-Royce Engine Plant.

Because of its large capacity (will handle work up to 18" x 18"); because it cuts at any angle from 45° right to 45° left; and because the blade remains vertical throughout its straight-forward carriage travel, the MARVEL No. 8 will do trimming, notching, mitering and cutting-off, and will save hours of machining by roughing out work to size and shape.

### ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave.

Chicago, U.S.A.

Eastern Sales Offices: 225 Lafayette St., New York



# SCRAP

... MARKET ACTIVITIES AND PRICE TRENDS

## Serious Situation Emphasized Anew

• • • While most consuming centers reported scrap receipts unchanged last week and still below requirements, new warnings of the situation's seriousness came from authorities, and many dealers redoubled their efforts to get out more material. Allocation orders are more numerous.

Eugene Grace of Bethlehem Steel Co. reported seven open hearths down for lack of scrap, five at Lackawanna, one at Bethlehem and one at Johnstown. Describing the situation in scrap as "still a headache," he said the company is striving to improve its position by construction of two new blast furnaces with annual capacity of 800,000 tons of pig iron.

At Chicago an open hearth which went down last week was said to be lacking scrap. This was the first of the district's furnaces reported down for this reason.

Meanwhile, A. D. Whiteside, OPM Iron and Steel branch chief, in a telegram to Gov. Van Wag-  
oner of Michigan, asserted that the shortage of iron and steel scrap is no myth but is imminent. His telegram was inspired by a statement by a CIO regional director who charged that a scrap collection campaign projected in Michigan was "predicated on an alleged shortage existing in the steel industry."

Whiteside told the Governor that the Michigan program is very necessary and added the OPM is hopeful that it will be prosecuted with vigor. He said, "The fact is, a serious shortage of iron and steel scrap is imminent and already some steel production has been

lost due to a lack of scrap. Compared with a total consumption of 26,800,000 gross tons in 1917, the peak year of the first World War period, steel mills and foundries in the first nine months of 1941 already had consumed over 39,000,000 gross tons. The industrial requirement for all 1941 is around 52,000,000 gross tons. From dealers, who would prepare and ship to the mills such scrap as would be attracted, using of a program such as Michigan is undertaking, the government is expecting 28,000,000 tons this year, compared with 17,000,000 tons last year. Consumption during 1941 has exceeded collection of scrap with the result that stocks have been drawn down in some cases to the vanishing point."

## Lower Ceiling Prices on Relaying Rails Coming

Washington

• • • A separate schedule of maximum prices for second-hand railroad rail that is sold for further transportation use, known to the trade as "relaying" rail, will be issued in the near future by the Office of Price Administrator Leon Henderson. Announced last Thursday, following an OPA meeting the previous day with dealers in such rails, the ceiling prices, he said, will be generally lower than those currently prevailing. Demand for second-hand rail, Mr. Henderson said, has risen sharply since supplies of new rail have become restricted as a result of the defense program. Demand has been particularly heavy from industrial and mining areas and from ordnance centers.

Pittsburgh—Incoming supplies here are still far from enough to take care of present steel mill operations and inventories are being depleted. Some mills remain on a hand-to-mouth basis, using scrap as it arrives. Consumers and brokers alike look for a large number of allocation cases as soon as extreme winter weather sets in. Some mills in the district were forced last week to eat into vital scrap piles to make up for the loss in pig iron occasioned by the short-lived captive mine strike. It is understood mills near this district continue to have the OPM allocate supplies to them in order to prevent shut downs in furnaces.

*This* KENNAMETAL  
TOOL TIP  
COSTS AS LITTLE  
AS \$1.30



## BUT IS MORE VALUABLE THAN GOLD

The value of metals today is measured not so much by their cost in dollars and cents as by their importance in defense production. An outstanding example is KENNAMETAL, the accepted carbide tool material for machining steel of all hardnesses up to 550 Brinell. The tool blank illustrated costs as little as \$1.30 (in quantity lots), yet when brazed on the end of a tool used for turning, boring, or facing steel parts, it will reduce machining time by as much as 50%.

## Prompt Deliveries on Standard Tools and Blanks

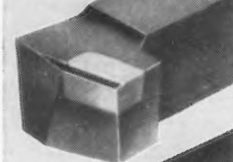
Standard and Modified Standard Kennametal tools are shipped within 10 days of receipt of order; Standard tool blanks within 3 to 4 days. Write for our new Catalog No. 42 listing specifications and prices.



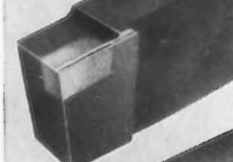
**MCKENNA METALS Co.**  
144 LLOYD AVE., LATROBE, PENNA.  
FOREIGN REPRESENTATIVES: U. S. STEEL EXPORT CO.  
(Exclusive of Canada, Great Britain and Possessions)

EXAMPLES OF WIDELY  
USED STANDARD TOOLS

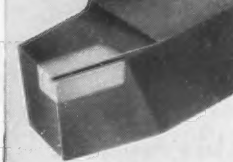
Style #21



Style #1



Style #11





Here the most serious situation faces electric steel furnaces with some companies depending on daily shipments to keep at current levels.

**Chicago**—Closing of this district's first open hearth due to scrap scarcity was reported last week-end. With one of the largest mills having lost over 25 cars on allocation, and with another major consumer reported to be on the verge of asking for an allocation, and with one mill said to have been ordered out of the market because of a better stock position, the entire district has reached the point where it can slide over the brink to reduced operations at any moment. Little talk is heard now of bringing scrap out if higher prices prevailed. The industry accepts the fact scrap is not available and higher prices might bring at best only one shot in the arm. With only one exception, every steel mill possesses a limiting stock pile. Brokers are doing less than 50 per cent of their volume of a year ago.

**Birmingham**—No improvement of any kind has occurred to better the scrap situation here. While steel mills continue to hope that the government's priority action will increase the flow of scrap, no increase has materialized in this district.

## Third Quarter Earnings of 19 Steel Producers

Company	3rd Quarter, 1941	2nd Quarter, 1941	3rd Quarter, 1940	9 Months, 1941
U. S. Steel Corp.	\$34,313,345	\$24,814,751	\$33,103,607	\$95,688,051
Bethlehem Steel Corp.	7,910,569	5,651,477	12,462,299	23,988,074
National Steel Corp.	4,411,466	5,291,430	3,827,311	15,133,294
Republic Steel Corp.	4,378,379	5,428,748	6,183,880	17,997,093
Jones & Laughlin Steel Corp.	3,942,157	3,937,720	2,956,647	12,040,384
Inland Steel Co.	3,675,724	4,102,572	4,918,818	12,333,414
Youngstown Sheet and Tube Co.	3,103,649	4,765,996	2,842,280	12,445,842
Wheeling Steel Corp.	1,873,355	2,708,187	1,611,108	6,562,551
American Rolling Mill Co.	1,547,784	3,068,735	1,804,511	8,215,760
Allegheny Ludlum Steel Corp.	904,379	1,449,183	1,300,582	3,989,236
Wickwire Spencer Steel Co.	556,305	481,229	277,423	1,224,093
Rustless Iron & Steel Corp.	545,740	582,762	300,675	1,710,210
Sharon Steel Corp.	412,899	285,988	365,975	1,226,140
Keystone Steel & Wire Co.	352,414	538,863	280,409	1,301,414
Otis Steel Co.	345,711	494,072	464,665	1,433,966
Continental Steel Corp.	294,592	324,435	139,312	932,149
Alan Wood Steel Co.	259,153	283,266	318,939	1,016,168
Superior Steel Corp.	141,548	243,790	75,776	613,702
Eastern Rolling Mill Co.	58,583	74,365	*41,686	174,825
TOTALS	\$69,027,752	\$64,527,569	\$73,192,531	\$218,026,266
* Loss.				

## October Ore Movement 9,596,064 Gross Tons

••• The accident at the Soo locks and unfavorable weather resulted in a decline of 715,413 gross tons in the movement of iron ore from the Upper Lakes during the month of October, compared with

September. The total for October was 9,596,064 gross tons, according to the Lake Superior Iron Ore Association. Total movement on Nov. 1, 1941, was 71,620,292 gross tons, which was 22.86 per cent above the movement at the same time last year.



IN EXPORT

SINCE 1903

30 CHURCH STREET, NEW YORK, U. S. A.

Cable Address: "STEELMAKER" New York

# Iron and Steel Scrap (other than railroad scrap)

(Maximum basing point prices as revised by OPA to Sept. 26, 1941, from which shipping point prices and consumers' delivered prices are to be computed, per gross ton)

Basing Points ➤	Pittsburgh	Johnstown	Warren	Youngstown	Sharon	Canton	Chicago	Kokomo	Bethlehem	Claymont	Coatesville	Phoenixville	Harrisburg	Sparrows Point	Buffalo	Cleveland	Toledo	Cincinnati*	Portsmouth	Middletown	Ashland	St. Louis	Detroit	Duluth	Minneapolis	Birmingham	Chattanooga	Radford, Va.	Worcester	Bridgeport	Phillipsdale	R. I.	Los Angeles	San Francisco	Seattle	Portland	Minneapolis, Colo.			
▼ GRADES																																								
No. 1 heavy melting.....	\$20.00	\$20.00	\$18.75	\$18.25	\$18.25	\$18.75	\$18.75	\$19.25	\$19.50	.....	\$19.50	\$17.50	\$17.85	\$18.00	\$17.00	.....	.....	\$19.50	\$17.50	\$17.85	\$18.00	\$17.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	\$14.50	\$16.50		
No. 1 hyd. comp. black sheet.....	20.00	20.00	18.75	18.25	18.25	18.75	18.75	19.25	19.50	.....	19.50	17.50	17.85	18.00	17.00	.....	.....	19.50	17.50	17.85	18.00	17.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14.50	16.50		
No. 2 heavy melting.....	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13.50	15.50		
Dealers' No. 1 bundles.....	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13.50	15.50		
Dealers' No. 2 bundles.....	18.00	18.00	16.75	16.25	16.25	16.75	16.75	17.25	17.50	.....	17.50	15.50	15.85	16.00	15.00	.....	.....	17.50	15.50	15.85	16.00	15.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12.50	14.50		
Mixed borings and turnings.....	15.25	15.25	14.00	14.25	13.50	14.00	14.00	14.50	14.75	13.10	14.75	12.75	13.10	.....	.....	.....	.....	14.75	12.75	13.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9.75	11.75		
Machine shop turnings.....	15.50	15.50	14.25	14.50	13.75	14.25	14.25	14.75	15.00	13.35	15.00	13.00	13.35	15.50	15.00	.....	.....	15.00	13.00	13.35	15.50	15.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10.00	12.00	
Shoveling turnings.....	16.50	16.50	15.25	15.50	14.75	15.25	15.25	15.75	16.00	14.35	16.00	14.00	14.35	16.50	16.00	.....	.....	16.00	14.00	14.35	16.50	16.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11.00	13.00	
No. 1 busheling.....	19.50	19.50	18.25	17.75	17.75	18.25	18.25	18.75	19.00	.....	19.00	17.00	17.35	17.50	16.00	.....	.....	19.00	17.00	17.35	17.50	16.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14.00	16.00	
No. 2 busheling.....	15.50	15.50	14.25	13.75	13.75	14.25	14.25	14.75	15.00	.....	15.00	13.00	13.35	13.50	12.50	.....	.....	15.00	13.00	13.35	13.50	12.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10.00	12.00	
Cast iron borings.....	15.75	15.75	14.50	14.00	14.00	14.50	14.50	15.00	15.25	13.60	15.25	13.25	13.60	13.75	12.75	.....	.....	15.25	13.25	13.60	13.75	12.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	10.25	12.25	
Uncut structural, plate scrap.....	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	13.50	15.50	
No. 1 cupola.....	21.00	21.00	20.00	20.00	22.50	23.00	22.00	20.00	22.00	.....	21.00	20.00	20.35	19.00	20.00	20.50	.....	21.00	20.00	20.35	19.00	20.00	20.50	21.00	21.50	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	18.00	20.00	
Heavy breakable cast.....	19.50	19.50	18.50	18.50	21.00	21.50	21.00	18.50	20.50	.....	19.50	18.50	18.85	17.50	18.50	.....	.....	19.50	18.50	18.85	17.50	18.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	17.00	19.00	
Stove plate.....	19.00	19.00	17.00	16.00	18.00	18.50	18.00	19.00	18.00	15.60	17.50	17.00	14.10	16.00	17.00	17.50	.....	17.50	17.00	14.10	16.00	17.00	17.50	18.00	17.50	14.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	14.00	16.00	
Low phos. billet, bloom crops.....	25.00	25.00	23.75	23.75	23.25	23.75	23.75	24.25	24.50	.....	23.50	22.50	22.85	23.00	22.00	.....	.....	23.50	22.50	22.85	23.00	22.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19.50	21.50
Low phos. bar crops, smaller.....	23.00	23.00	21.75	21.75	21.25	21.75	21.75	22.25	22.50	.....	21.50	20.50	20.85	21.00	20.00	.....	.....	21.50	20.50	20.85	21.00	20.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	19.50	21.50
Low phos. pu'ch'gs, plate scrap <sup>1</sup> .....	24.75	24.75	23.00	21.75	21.25	21.75	21.75	22.25	22.50	.....	21.50	20.50	20.85	21.00	20.00	.....	.....	21.50	20.50	20.85	21.00	20.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	17.50	19.50
Machinery cast, cupola size <sup>2</sup> .....	22.00	22.00	21.00	21.00	23.50	24.00	23.50	21.00	23.00	.....	22.00	21.00	21.35	20.00	21.00	21.50	22.00	22.00	21.00	21.35	20.00	21.00	21.50	22.00	22.00	23.00	19.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
No. 1 mach. cast, drop-broken, 150 lb. and under.....	22.50	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	.....	22.50	21.50	21.85	20.50	21.50	22.00	22.50	22.50	21.50	21.85	20.50	21.50	22.00	22.50	23.50	19.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Clean auto cast.....	22.50	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	.....	22.50	21.50	21.85	20.50	21.50	22.00	22.50	22.50	21.50	21.85	20.50	21.50	22.00	22.50	23.50	19.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Punchings and plate scrap <sup>3</sup> .....	23.75	23.75	20.75	20.75	20.25	20.75	20.75	21.25	21.50	.....	20.50	19.50	19.85	20.00	19.00	.....	.....	20.50	19.50	19.85	20.00	19.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Punchings and plate scrap <sup>4</sup> .....	22.75	22.75	19.75	19.75	19.25	19.75	19.75	20.25	20.50	.....	19.50	18.50	18.85	19.00	18.00	.....	.....	19.50	18.50	18.85	19.00	18.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Heavy axle, forge turnings.....	21.25	19.50	18.25	18.25	17.75	18.25	18.25	18.75	19.00	.....	18.00	17.00	17.35	17.50	16.50	.....	.....	18.00	17.00	17.35	17.50	16.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Medium h'vy el'f'ce turnings.....	19.75	18.00	16.75	16.75	16.25	16.75	16.75	17.25	17.50	.....	16.50	15.50	15.85	16.00	15.00	.....	.....	16.50	15.50	15.85	16.00	15.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	

<sup>1</sup> This grade is 3/4-in. and heavier, cut 12 in. and under. <sup>2</sup> May include clean agricultural cast. <sup>3</sup> Under 3/4 to 1 1/4-in., cut 12 in. and under. <sup>4</sup> Under 1/4-in. to No. 12 gage, cut 12 in. and under. <sup>5</sup> Youngstown, Warren, Sharon and Canton are not basing points on this grade. <sup>6</sup> Middletown and Cincinnati price for this grade is \$15. \* Includes Newport, Ky. Shipping point price within Cincinnati basing point may be 80c. a ton below basing point price listed above for all grades except the six cast grades. \*\* Minneapolis and St. Paul are basing points on following grades only: No. 1 cupola, heavy breakable cast, stove plate, machinery cast cupola size, No. 1 machinery cast drop broken, clean auto cast.

## Railroad Scrap (Per gross ton, delivered consumers' plants located on line of railroad originating scrap)

Basing Points ➔	Pittsburgh Sharon, Pa. Wheeling Steubenville Youngstown Canton	Chicago	Kokomo	Philadelphia	Wilmington	Sparrows Point	Cleveland	Buffalo	Portsmouth Middletown Ashland	St. Louis	Kansas City	Cincinnati	Detroit	Duluth	Birmingham	Los Angeles San Francisco Seattle
▼ GRADES																
No. 1 heavy melting.....	\$21.00	\$19.75	\$19.25	\$19.75	\$19.75	\$19.75	\$20.50	\$20.25	\$20.50	\$18.50	\$17.00	\$20.50	\$18.85	\$19.00	\$18.00	\$15.50
Scrap rails.....	22.00	20.75	20.25	20.75	20.75	20.75	21.50	21.25	21.50	19.50	18.00	21.50	19.85	20.00	19.00	16.50
Re-rolling rails.....	23.50	22.25	21.75	22.25	22.25	22.25	23.00	22.75	23.00	21.00	19.50	23.00	21.35	21.50	20.50	18.00
Scrap rails 3 ft. and under.....	24.00	22.75	22.25	22.75	22.75	22.75	23.50	23.25	23.50	21.50	20.00	23.50	21.85	22.00	21.00	18.50
Scrap rails 2 ft. and under.....	24.25	23.00	22.50	23.00	23.00	23.00	23.75	23.50	23.75	21.75	20.25	23.75	22.10	22.25	21.25	18.75
Scrap rails 18 in. and under.....	24.50	23.25	22.75	23.25	23.25	23.25	24.00	23.75	24.00	22.00	20.50	24.00	22.35	22.50	21.50	19.00

Railroads not operating in a basing point may sell re-rolling rails f.o.b. their lines at average price of their sales from Sept. 1, 1940, to Jan. 31, 1941. Re-rolling mills may absorb all transportation charges necessary to obtain such rails. Maximum prices for scrap rails and re-rolling rails from mines, logging camps and similar sources need not be sold for less than \$13.50 a gross ton for scrap rails and \$15 for re-rolling material at shipping point.

Where the railroad originator of the scrap operates in two or more of the basing points named, the highest of the maximum prices established for such basing points shall be the maximum price of the scrap delivered to a consumer's plant at any point on the railroad's line, except that switching charges of 84c. per gross ton shall be subtracted from the maximum prices of scrap originating from railroads operating in Chicago and sold for consumption outside Chicago.

## Explanatory Notes

(A basing point includes its switching district)

**MAXIMUM PRICE** at which any grade of scrap may be delivered to consumer's plant, wherever located, is the shipping point price, plus actual transportation from the shipping point to consumer. Where shipment is by water, actual handling charges at the dock of not more than 75c. a gross ton may be included as part of transportation charges. In no case may this maximum price exceed by more than \$1 prices (for material other than railroad scrap) for the basing point nearest the consumer.

**COMPUTING SHIPPING POINT PRICE:** A shipping point is the point from which the scrap is to be shipped to a consumer. A shipping point price is computed as follows: (a) For Shipping Points located within a basing point.—The price established for the basing point in which the shipping point is located, is determined. Then deduct from this the actual costs involved in transporting scrap from the shipping point to the consumer's plant within the basing point which is nearest, in terms of transportation costs, to the shipping point; (b) For shipping points located outside a basing point.—The price established for the nearest basing point, in terms of transportation charges, to the shipping point is determined. Deduct from this the lowest established charge for transporting scrap from the shipping point to such basing point. **Exceptions:** (1) The shipping point price at any shipping point in New England, of those grades of scrap for which no prices are listed above shall be the Johnstown basing point price, minus the all-rail transportation costs from the New England shipping point to Johnstown; (2) Shipping point prices for New York City, Brooklyn, New York, and New Jersey shall be computed from the Bethlehem, Pa., basing point.

**GULF PORT PRICES:** Scrap shipped from Tampa, Pensacola, Gulfport, Mobile, New Orleans, Lake Charles, Port Arthur, Beaumont, Galveston, Texas City, Houston and Corpus Christi, has a maximum shipping point price not exceeding \$14 a gross ton, f.o.b. cars, for No. 1 heavy melting steel. For other grades, the differentials established for Birmingham apply.

**REMOTE SCRAP:** Defined as all grades of scrap listed in table above (exclusive of railroad scrap) located in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas and Oklahoma. Maximum shipping point price of remote scrap is \$12 a gross ton, for No. 2 heavy melting steel, with differentials for other grades the same as differentials established in table above for St. Louis. The maximum delivered price of remote scrap is the shipping point price, plus actual transportation

charges, except that when necessary to absorb transportation charges, the maximum delivered price may be exceeded by a maximum of \$4 a ton. Thus the maximum delivered price for remote scrap may exceed the price for the nearest basing point by \$5. In the event that an allowance in excess of \$5 a ton is necessary to acquire a tonnage of remote scrap, a consumer may apply to OPA for permission to exceed the \$5 allowance. Purchases under these remote scrap provisions must be for not less than one car a month and must be reported in detail. Provisions of this remote scrap section expire Dec. 31, 1941.



# ... Comparison of Prices

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*)

(Prices Are F.O.B. Major Basing Points)

	Nov. 3, 1941	Oct. 28, 1941	Oct. 7, 1941	Nov. 4, 1940
<b>Flat Rolled Steel:</b> (Cents Per Lb.)				
Hot rolled sheets.....	2.10	2.10	2.10	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip.....	2.10	2.10	2.10	2.10
Cold rolled strip.....	2.80	2.80	2.80	2.80
Plates.....	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

<b>Tin and Terne Plate:</b> (Dollars Per Base Box)				
Tin plate.....	\$5.00	\$5.00	\$5.00	\$5.00
Manufacturing ternes ...	4.30	4.30	4.30	4.30

<b>Bars and Shapes:</b> (Cents Per Lb.)				
Merchant bars.....	2.15	2.15	2.15	2.15
Cold finished bars.....	2.65	2.65	2.65	2.65
Alloy bars.....	2.70	2.70	2.70	2.70
Structural shapes.....	2.10	2.10	2.10	2.10
Stainless bars (No. 302)...	24.00	24.00	24.00	24.00

<b>Wire and Wire Products:</b> (Cents Per Lb.)				
Plain wire.....	2.60	2.60	2.60	2.60
Wire nails.....	2.55	2.55	2.55	2.55

<b>Rails:</b> (Dollars Per Gross Ton)				
Heavy rails.....	\$40.00	\$40.00	\$40.00	\$40.00
Light rails.....	40.00	40.00	40.00	40.00

<b>Semi-Finished Steel:</b> (Dollars Per Gross Ton)				
Rerolling billets.....	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars.....	34.00	34.00	34.00	34.00
Slabs.....	34.00	34.00	34.00	34.00
Forging billets.....	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

<b>Wire Rods and Skelp:</b> (Cents Per Lb.)				
Wire rods.....	2.00	2.00	2.00	2.00
Skelp (grv'd).....	1.90	1.90	1.90	1.90

<b>Pig Iron:</b> (Per Gross Ton)				
No. 2 fdy., Philadelphia..	\$25.84	\$25.84	\$25.84	\$24.84
No. 2, Valley furnace....	24.00	24.00	24.00	23.00
No. 2, Southern Cin'ti...	24.06	24.06	24.06	23.06
No. 2, Birmingham.....	20.38	20.38	20.38	19.38
No. 2, foundry, Chicago†.	24.00	24.00	24.00	23.00
Basic, del'd eastern Pa...	25.34	25.34	25.34	24.34
Basic, Valley furnace....	23.50	23.50	23.50	22.50
Malleable, Chicago†.....	24.00	24.00	24.00	23.00
Malleable, Valley.....	24.00	24.00	24.00	23.00
L. S. charcoal, Chicago..	31.34	31.34	31.34	30.34
Ferromanganese†.....	120.00	120.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

<b>Scrap:</b> (Per Gross Ton)				
Heavy melt'g steel, P'gh..	\$20.00	\$20.00	\$20.00	\$21.50
Heavy melt'g steel, Phila.	18.75	18.75	18.75	20.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	19.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	18.50
Low phos. plate, Youngs'n	23.00	23.00	23.00	24.00
No. 1 cast, Pittsburgh...	22.00	22.00	22.00	22.25
No. 1 cast, Philadelphia..	24.00	24.00	24.00	22.75
No. 1 cast, Ch'go*.....	21.00	21.00	21.00	17.75

\*Changed to gross ton basis, April 3, 1941.

<b>Coke, Connellsville:</b> (Per Net Ton at Oven)				
Furnace coke, prompt...	\$6.125	\$6.125	\$6.125	\$4.75
Foundry coke, prompt...	6.875	6.875	6.875	5.25

<b>Non-Ferrous Metals:</b> (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*..	12.00	12.00	12.00	12.00
Copper, Lake, New York.	12.00	12.00	12.00	12.00
Tin (Straits), New York.	52.00	52.00	52.00	51.00
Zinc, East St. Louis.....	8.25	8.25	7.25	7.25
Lead, St. Louis.....	5.70	5.70	5.70	5.35
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

\*Mine producers only.

The various basing points for finished and semi-finished steel are listed in detailed price tables, pages 142-148. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

# ... Composite Prices

FINISHED STEEL				PIG IRON				SCRAP STEEL			
Nov. 3, 1941.....	2.30467c.	a Lb.....	.....	\$23.61	a Gross Ton.....	.....	\$19.17	a Gross Ton.....	.....	.....	.....
One week ago.....	2.30467c.	a Lb.....	.....	\$23.61	a Gross Ton.....	.....	\$19.17	a Gross Ton.....	.....	.....	.....
One month ago.....	2.30467c.	a Lb.....	.....	\$23.61	a Gross Ton.....	.....	\$19.17	a Gross Ton.....	.....	.....	.....
One year ago.....	2.30467c.	a Lb.....	.....	\$22.61	a Gross Ton.....	.....	\$20.67	a Gross Ton.....	.....	.....	.....

	High	Low
1941.....	2.30467c.,	2.30467c.,
1940.....	2.30467c., Jan. 2	2.24107c., Apr. 16
1939.....	2.35367c., Jan. 3	2.26689c., May 16
1938.....	2.58414c., Jan. 4	2.27207c., Oct. 18
1937.....	2.58414c., Mar. 9	2.32263c., Jan. 4
1936.....	2.32263c., Dec. 28	2.05200c., Mar. 10
1935.....	2.07642c., Oct. 1	2.06492c., Jan. 8
1934.....	2.15367c., Apr. 24	1.95757c., Jan. 2
1933.....	1.95578c., Oct. 3	1.75836c., May 2
1932.....	1.89196c., July 5	1.83901c., Mar. 1
1931.....	1.99629c., Jan. 13	1.86586c., Dec. 29
1930.....	2.25488c., Jan. 7	1.97319c., Dec. 9
1929.....	2.31773c., May 28	2.26498c., Oct. 29

A weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip. These products represent 78 per cent of the United States output. This revised index recapitulated to 1929 in the Aug. 28, 1941, issue.

	High	Low
\$23.61, Mar. 20	\$23.45, Jan. 2	
23.45, Dec. 23	22.61, Jan. 2	
22.61, Sept. 19	20.61, Sept. 12	
23.25, June 21	19.61, July 6	
23.25, Mar. 9	20.25, Feb. 16	
19.74, Nov. 24	18.73, Aug. 11	
18.84, Nov. 5	17.83, May 14	
17.90, May 1	16.90, Jan. 27	
16.90, Dec. 5	13.56, Jan. 3	
14.81, Jan. 5	13.56, Dec. 6	
15.90, Jan. 6	14.79, Dec. 15	
18.21, Jan. 7	15.90, Dec. 16	
18.71, May 14	18.21, Dec. 17	

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

	High	Low
\$22.00, Jan. 7	\$19.17, Apr. 10	
21.83, Dec. 30	16.04, Apr. 9	
22.50, Oct. 3	14.08, May 16	
15.00, Nov. 22	11.00, June 7	
21.92, Mar. 30	12.92, Nov. 10	
17.75, Dec. 21	12.67, June 9	
13.42, Dec. 10	10.33, Apr. 29	
13.00, Mar. 13	9.50, Sept. 25	
12.25, Aug. 8	6.75, Jan. 3	
8.50, Jan. 12	6.43, July 5	
11.33, Jan. 6	8.50, Dec. 29	
15.00, Feb. 18	11.25, Dec. 9	
17.58, Jan. 29	14.08, Dec. 3	

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

# Prices of Finished Iron and Steel...

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product													DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
<b>SHEETS</b>															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled <sup>1</sup>	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes <sup>2</sup>	3.80¢		3.80¢									4.55¢			
<b>STRIP</b>															
Hot rolled <sup>3</sup>	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled <sup>4</sup>	2.80¢	2.90¢		2.80¢			2.80¢		(Worcester = 3.00¢)				2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢			2.95¢			2.95¢		(Worcester = 3.35¢)				3.05¢	3.31¢	
<b>TIN PLATE</b>															
Standard cokes, base box	\$5.00	\$5.00	\$5.00						\$5.10						\$5.32
<b>BLACK PLATE</b>															
29 gage <sup>5</sup>	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ ( <sup>10</sup> )			3.37¢
<b>TERNES M'FG.</b>															
Special coated, base box	\$4.30	\$4.30	\$4.30						\$4.40						
<b>BARs</b>															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			(Duluth = 2.25¢)		2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel <sup>6</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail) <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold finished <sup>8</sup>	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)					3.01¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢			(Bethlehem, Massillon, Canton = 2.70¢)				2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
									(Coatesville and Claymont = 2.10¢)						
<b>PLATES</b>															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢( <sup>11</sup> )		2.45¢	2.65¢	2.25¢	2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢							(Coatesville = 3.50¢)		3.95¢	4.15¢		3.70¢	3.37¢
<b>SHAPES</b>															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢			(Bethlehem = 2.10¢)		2.45¢	2.75¢		2.27¢	2.215¢
<b>SPRING STEEL C-R</b>															
0.26 to 0.50 Carbon	2.80¢			2.80¢					(Worcester = 3.00¢)						
0.51 to 0.75 Carbon	4.30¢			4.30¢					(Worcester = 4.50¢)						
0.76 to 1.00 Carbon	6.15¢			6.15¢					(Worcester = 6.35¢)						
1.01 to 1.25 Carbon	8.35¢			8.35¢					(Worcester = 8.55¢)						
<b>WIRE<sup>9</sup></b>															
Bright	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)			3.10¢			2.92¢
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢				(Worcester = 2.70¢)			3.10¢			2.92¢
Spring	3.20¢	3.20¢		3.20¢					(Worcester = 3.30¢)			3.80¢			3.52¢
<b>PILING</b>															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢
<b>IRON BARS</b>															
Common		2.25¢							(Terre Haute, Ind. = 2.15¢)						
Wrought single refined	4.40¢														
Wrought double refined	5.49¢														

<sup>1</sup> Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. <sup>2</sup> Unassorted 8-lb. coating. <sup>3</sup> Widths up to 12 in. <sup>4</sup> Carbon 0.25 per cent and less. <sup>5</sup> Applies to certain width and length limitations. <sup>6</sup> For merchant trade. <sup>7</sup> Straight lengths as quoted by distributors. <sup>8</sup> Also shafting. For quantities of 20,000 to 39,999 lb. <sup>9</sup> Carload lot to manufacturing trade. <sup>10</sup> Boxed. <sup>11</sup> Ship plates only.



## SEMI-FINISHED STEEL

**Billets, Blooms and Slabs**

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2 higher; f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton  
Rerolling ..... \$34.00  
Forging quality ..... 40.00

**Shell Steel**

Basic open hearth shell steel, f.o.b. Pittsburgh and Chicago.

Per Gross Ton  
3 in. to 12 in. .... \$52.00  
12 in. to 18 in. .... 54.00  
18 in. and over ..... 56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

**Sheet Bars**

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton  
Open hearth or bessemer ..... \$34.00

**Skelp**

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.  
Grooved, universal and sheared 1.90c.

**Wire Rods**

(No. 5 to 9/32 in.) Per Lb.  
Pittsburgh, Chicago, Cleveland. 2.00c.  
Worcester, Mass. .... 2.10c.  
Birmingham ..... 2.00c.  
San Francisco ..... 2.50c.  
Galveston ..... 2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

**Alloy Steel Blooms, Billets and Slabs**

Per Gross Ton  
Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem ..... \$54.00

**TOOL STEEL**

(F.o.b. Pittsburgh)

Base per Lb.  
High speed ..... 67c.  
High-carbon-chromium ..... 43c.  
Oil hardening ..... 24c.  
Special carbon ..... 22c.  
Extra carbon ..... 18c.  
Regular carbon ..... 14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

## PIG IRON

All prices set in bold face type are maxima established by OPACS on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorous	Charcoal
Boston	\$25.50	\$25.00	\$26.50	\$26.00	.....	.....
Brooklyn	27.50	.....	.....	28.00	.....	.....
Jersey City	26.53	26.03	27.53	27.03	.....	.....
Philadelphia	25.84	25.34	26.84	26.34	.....	.....
Bethlehem, Pa.	\$25.00	\$24.50	\$26.00	\$25.50	.....	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	.....	24.50	.....	.....	\$29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati	24.44	24.61	.....	25.11	.....	.....
Canton, Ohio	25.39	24.89	25.89	25.39	.....	.....
Mansfield, Ohio	25.94	25.44	26.44	25.94	.....	.....
St. Louis	24.50	24.02	.....	.....	.....	.....
Chicago	24.00	23.50	24.50	24.00	.....	\$31.34
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio	24.00	23.50	.....	24.00	.....	.....
Toledo	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	.....	.....
Detroit	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.	.....	.....	.....	.....	.....	\$28.00
Lyles, Tenn. fc.†	.....	.....	.....	.....	.....	33.00
St. Paul	26.63	.....	27.13	26.63	.....	.....
Duluth	24.50	.....	25.00	24.50	.....	.....
Birmingham	20.38	19.00	25.00	.....	.....	.....
Los Angeles	27.50	.....	.....	.....	.....	.....
San Francisco	27.50	.....	.....	.....	.....	.....
Seattle	27.50	.....	.....	.....	.....	.....
Provo, Utah	22.00	.....	.....	.....	.....	.....
Montreal	27.50	27.50	.....	28.00	.....	.....
Toronto	25.50	25.50	.....	26.00	.....	.....

## GRAY FORGE IRON

Valley or Pittsburgh furnace ..... \$23.50

\*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of basic grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

†Price shown is for low-phosphorous iron; high-phosphorous sells for \$28.50 at the furnace.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

## WAREHOUSE PRICES

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled	\$3.35	\$3.25	\$3.35	\$3.75	\$3.58	\$3.43	\$3.25	\$3.71	\$3.45	\$3.39	\$3.30	\$3.38	\$5.10
Sheets, cold rolled	.....	4.10	4.05	4.05	4.60	4.30	4.30	3.68	.....	4.24	4.35	4.23	7.30
Sheets, galvanized	4.65	4.85	4.75	5.00	5.00	4.84	4.75	5.11	4.75	4.99	4.75	4.98	6.30
Strip, hot rolled	3.60	3.60	3.50	3.95	3.96	3.68	3.82	4.06	3.70	3.74	3.65	3.73	.....
Strip, cold rolled	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46	.....	3.61	3.83	3.54	.....
Plates	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.95
Structural shapes	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.95
Bars, hot rolled	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	**4.15
Bars, cold finished	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.50	.....	7.72	7.45	7.58	10.35
Bars, ht. rld. SAE 3100	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	.....	6.02	6.00	5.88	9.35
Bars, cd. drn. SAE 2300	8.40	8.40	8.40	8.56	8.84	8.70	8.40	8.63	.....	8.77	8.84	8.63	11.35
Bars, cd. drn. SAE 3100	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	.....	7.12	7.44	6.98	10.35

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 24 ga.—1 to 1499 lb. Extras for size, quality, etc., apply on above quotations.

\*12 gage and heavier, \$3.43. \*\*Over 4 in. wide and over 1 in. thick, \$4.95.

### CORROSION AND HEAT-RESISTING STEELS

(Per lb. base price, f.o.b. Pittsburgh)

#### Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

#### Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.73c.	16.15c.	19.13c.	23.38c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	25.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

#### Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

\*Includes annealing and pickling.

### ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
*Motor	4.95c.
*Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 75c. per 100 lb.

\*In some instances motor grade is referred to as dynamo grade and dynamo grade is referred to as dynamo special.

### ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

### BOLTS, NUTS, RIVETS, SET SCREWS

#### Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago

Per Cent Off List

#### Machine and Carriage Bolts:

6½ in., shorter and smaller	65½
6 x ¾ in., and shorter	63½
6 in. by ¾ to 1 in. and shorter	61
1½ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

#### Nuts, Cold Punched or Hot Pressed:

(hexagon or square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1½ to 1½ in. inclusive	57
1½ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

#### Semi-Fin. Hexagon Nuts U.S.S. S.A.E.

7/16 in. and smaller	64
½ in. and smaller	62
½ in. through 1 in.	60
9/16 to 1 in.	59
1½ in. through 1½ in.	57
1½ in. and larger	56

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	71 and 10
Stove bolts in packages, with nuts attached	71
Stove bolts in bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

#### Large Rivets

(½ in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.75
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#### Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5
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#### Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

### WIRE PRODUCTS

(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	\$2.55
Coated nails	2.55
Cut nails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	\$3.05
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Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

\*15½ gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

### BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes

Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Lap	Seamless	Weld.
	Cold	Hot	Hot
	Drawn	Hot	Hot
	\$	\$	\$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

### STEEL AND WROUGHT IRON PIPE AND TUBING

#### Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills (F.o.b. Pittsburgh only on wrought pipe)

Base Price = \$200 Per Net Ton

#### Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

#### Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

#### Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

#### Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

#### Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

#### Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

#### Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

#### Wrought Iron (Same as above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld 8 in. and smaller.

### CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	\$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

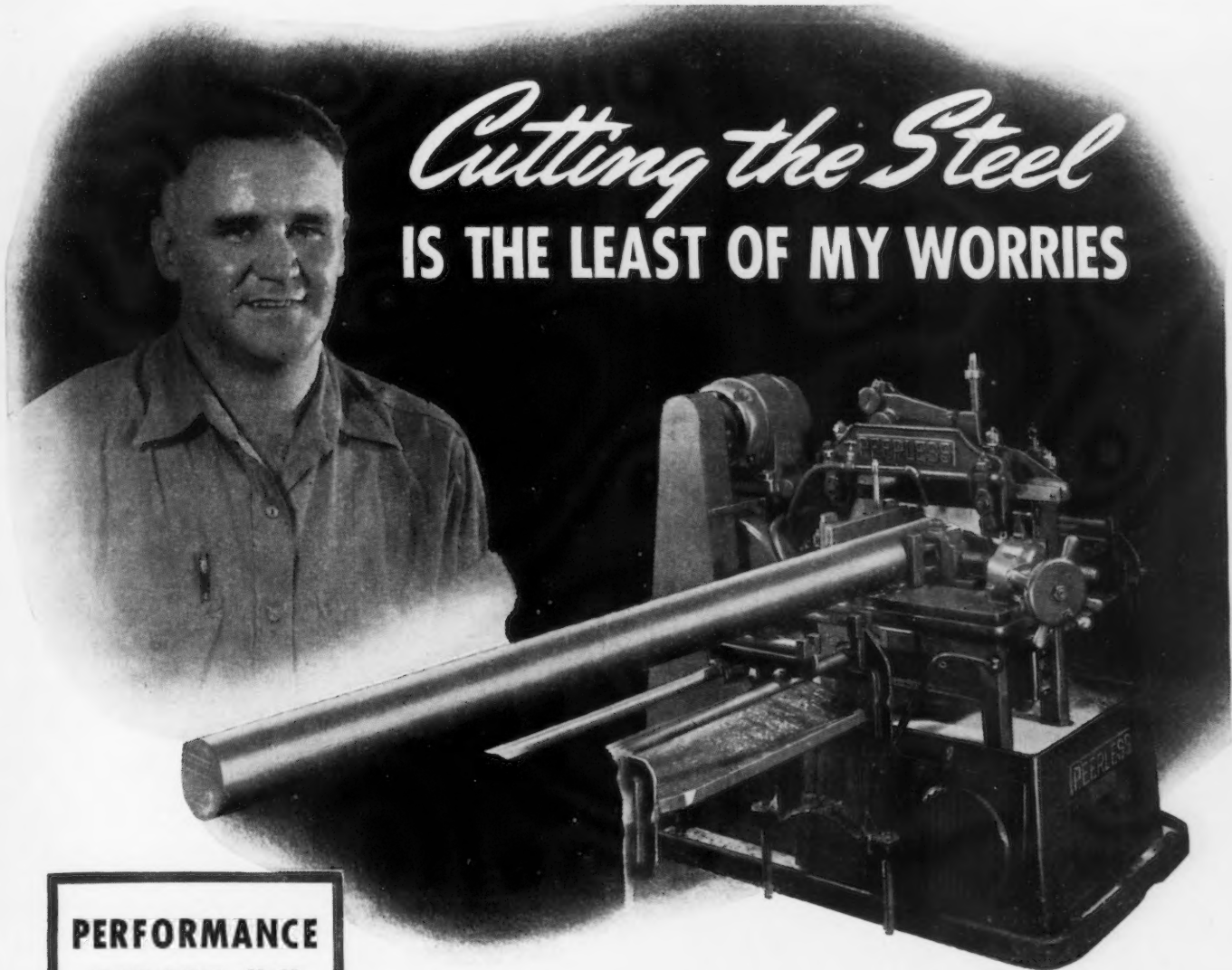
Class "A" and gas pipe, \$3 extra: 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

### FUEL OIL

No. 3, f.o.b. Bayonne, N. J.	5.20c.
No. 6, f.o.b. Bayonne, N. J.	3.21c.
No. 6 Bur. Stds., del'd Chicago	4.50c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 6 indus., del'd Cleveland	5.00c.



# Cutting the Steel IS THE LEAST OF MY WORRIES



## PERFORMANCE REPORT "L"

The Peerless 10 inch High Duty Hydraulic is Cutting 5 inch Mild Steel Rounds, 19.6 square inch per cut, in 4 minutes.

## ... AND FOR SAFETY YOU CAN'T BEAT SAWING METAL WITH A PEERLESS

The production capacity you want is available in a Peerless! You get peak production with maximum safety for the man, the material, and the machine. Sawing cannot fracture or surface-harden the stock at the cut.

Peerless combines safety with speed.

Peerless is the only Saw with a Four-Sided Saw-Frame — the frame that completely surrounds the blade and the work. This holds the blade with a tension and rigidity never before possible — prevents bowing . . . permits blade to lift and to clear on every return stroke . . . and thereby lengthens blade life. Peerless is the only Saw fully controlled hydraulically; including length gauging.

Check the speed of a Peerless on some of your own regular or special types of work.

PEERLESS MACHINE COMPANY • RACINE, WISCONSIN

**Peerless**  
METAL SAWING MACHINES

PEERLESS MACHINE COMPANY, Dept. 1A-1141, Racine, Wisconsin

Mail cutting time estimate for.....

- ☐ Mail catalog on Hydraulic type Saw for High Production Cutting
- ☐ Mail catalog covering Vertical type used for Die Block Work
- ☐ Mail catalog on Mechanical type Saw for production cutting
- ☐ Mail catalog on general utility and maintenance Saws

Company.....

Individual.....

Street.....

City..... State.....

FAST, ACCURATE CUTTING DEMANDS POSITIVE BLADE CONTROL

# PRICES

## FERROALLOYS

### Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads).....\$120.00

### Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....\$36.00  
Domestic, 26 to 28%..... 49.50

### Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk).....\$74.50  
50% (ton lots, packed)..... 87.00  
75% (carload lots, bulk).....135.00  
75% (ton lots, packed).....151.00

### Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.O.B. Jackson, Ohio.....\$29.50\*  
Buffalo .....\$30.75\*

For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.

\*Official OPACS price established June 24.

### Bessemer Ferrosilicon

Prices are \$1 a ton above Silvery Iron quotations of comparable analysis.

### Ferrochrome

(Per Lb. Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon.....13.00c.  
2 carbon .....19.50c.  
1 carbon .....20.50c.  
0.10 carbon .....22.50c.  
0.06 carbon .....23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

### Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon .....\$113.00\*  
2.50 carbon ..... 118.00\*  
2 carbon ..... 123.00\*  
1 carbon ..... 133.00\*

### Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload.... \$2.00  
Ferrotungsten, 100 lb. and less \$2.25  
Ferrovanadium, contract, per lb. contained V, del'd \$2.70 to \$2.90†  
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots..... \$2.25†  
Ferrocobalttitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload, contract, net ton.....\$142.50  
Ferrocobalttitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload, contract, net ton.....\$157.50

Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage freight, equalized with Rockdale, Tenn., gross ton..... \$58.50

Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage, freight equalized with Nashville, gross ton..... \$75.00

Ferromolybdenum, per lb. Mo, f.o.b. furnace ..... 95c.

Calcium molybdate, per lb. Mo, f.o.b. furnace..... 80c.

Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.... 80c.

Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. 80c.

\*Spot prices are \$5 per ton higher.  
†Spot prices are 10c. per lb. of contained element higher.

## ORES

### Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton  
Old range, bessemer, 51.50.... \$4.75  
Old range, non-bessemer, 51.50 4.60  
Mesaba, bessemer, 51.50..... 4.60  
Mesaba, non-bessemer, 51.50... 4.45  
High phosphorus, 51.50..... 4.35

### Foreign Ores\*

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

Per Unit  
African, Indian, 44-48 Mn. .65c. to 66c.  
African, Indian, 49-51 Mn. .67c. to 69c.

Brazilian, 46-48 Mn.....69c.  
Cuban, del'd, 51 Mn.....78c.

Per Short Ton Unit

Tungsten, Chinese Wolframite, duty paid, delivered....\$24 to \$26  
Tungsten, domestic scheelite, at mine .....\$24.00 to \$25.00  
Chrome ore, lump, c.i.f. Atlantic Seaboard, per gross ton; South African (low grade)..Nom.  
Rhodesian, 45 .....\$32.00  
Rhodesian, 48 .....\$39.00-\$40.00

\*Importations no longer readily available. Prices shown are nominal.

## COKE\*

### Furnace

Per Net Ton

Connellsville, prompt ... \$6.00 to \$6.25

### Foundry

Connellsville, prompt ... \$6.75 to \$7.00

\*Maximum coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. †F.O.B. oven.

148—THE IRON AGE, November 6, 1941

## RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton.....\$40.00  
Angle bars, 100 lb..... 2.70

(F.o.b. Basing Points) Per Gross Ton

Light rails (from billets).....\$40.00  
Light rails (from rail steel)... 39.00

Base per Lb.

Cut spikes ..... 3.00c.  
Screw spikes ..... 5.15c.  
Tie plates, steel..... 2.15c.  
Tie plates, Pacific Coast..... 2.30c.  
Track bolts, heat treated, to railroads ..... 5.00c.  
Track bolts, jobbers discount.. 63-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneaqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

## FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail.....\$22.00 to \$23.00  
Domestic, f.o.b. Ohio River landing barges .....22.00 to 23.00  
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines...22.00 to 23.00  
Foreign, 85% calcium fluoride, not over 5% Si, c.i.f. Atlantic ports, duty paid.....Nominal  
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines... 31.00  
As above, in bags, f.o.b. same mines ..... 32.60

## REFRACTORIES

(F.o.b. Works)

Per 1000

Fire Clay Brick  
Super-duty brick, St. Louis...\$64.60  
First quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois ..... 51.30  
First quality, New Jersey..... 56.00  
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois ..... 46.55  
Second quality, New Jersey.... 51.00  
No. 1, Ohio..... 43.00  
Ground fire clay, net ton..... 7.60

### Silica Brick

Pennsylvania .....\$51.30  
Chicago District ..... 58.90  
Birmingham ..... 51.30  
Silica cement, net ton (Eastern) 9.00

### Chrome Brick

Per Net Ton

Standard, f.o.b. Baltimore, Plymouth Meeting and Chester...\$54.00  
Chemically bonded, f.o.b. Baltimore, Plymouth Meeting and Chester, Pa. .... 54.00

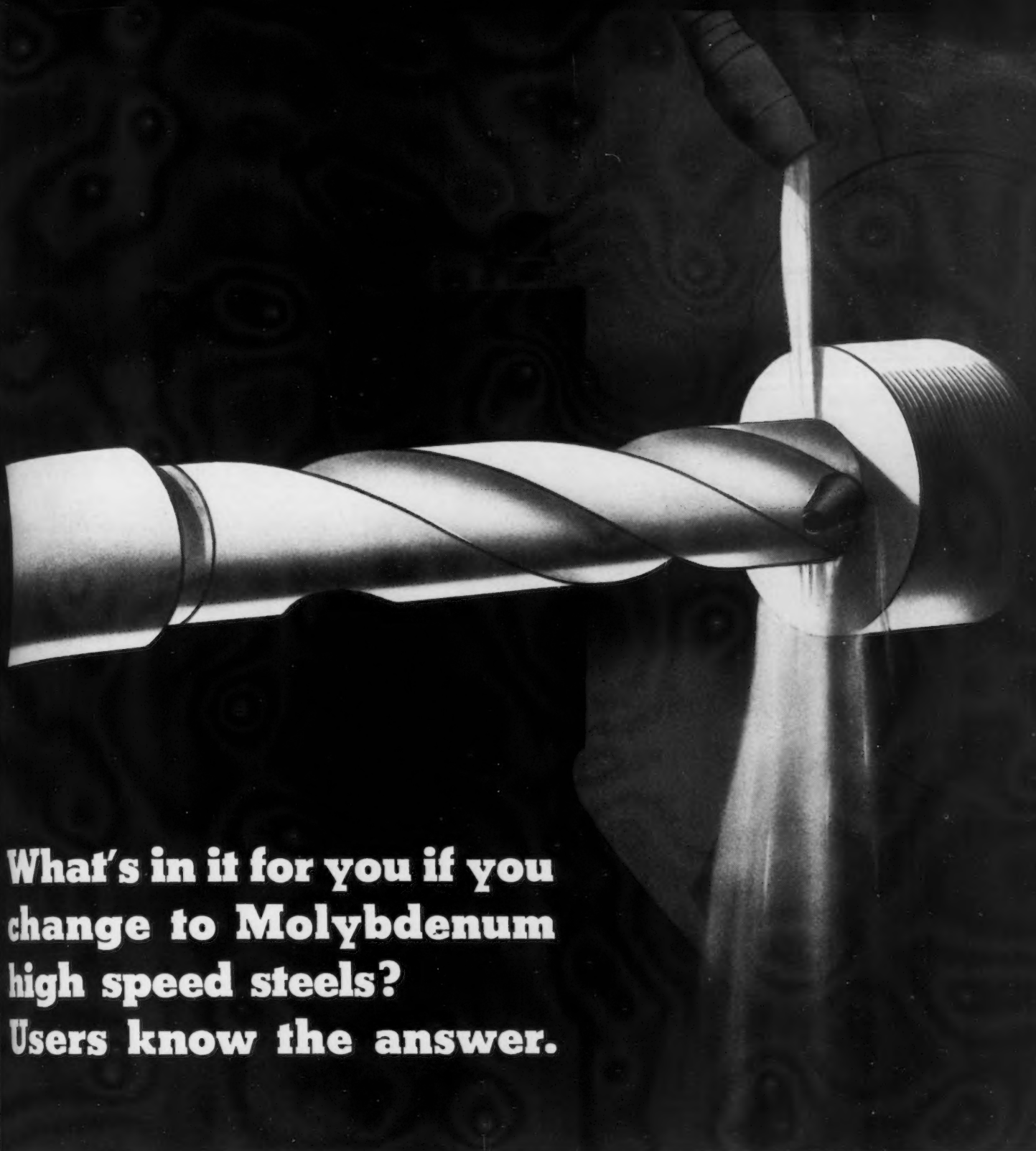
### Magnesite Brick

Standard f.o.b. Baltimore and Chester .....\$76.00  
Chemically bonded, f.o.b. Baltimore ..... 65.00

### Grain Magnesite

Domestic, f.o.b. Baltimore and Chester in sacks.....\$44.00  
Domestic, f.o.b. Chewelah, Wash. (in bulk) ..... 22.00





**What's in it for you if you  
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high speed steels?  
Users know the answer.**

There are three good reasons for changing to Molybdenum high speed steels.

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2. Better toughness.
3. Lower cost.

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costs. Confirmation is found in the experience of thousands of shops that have changed over from Tungsten high speed steels.

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**500 Fifth Avenue • New York City**

# SALES POSSIBILITIES

... CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

## North Atlantic States

• **Peerless Aluminum Castings Co.**, Andover and Albion Streets, Bridgeport, Conn., aluminum, brass, bronze and other metal castings, will take bids soon on general contract for one-story addition, 65 x 140 ft. Cost over \$50,000 with equipment. Peter P. Petrofsky, 955 Main Street, is architect.

**Hodgman Rubber Co.**, Herbert Street, Framingham, Mass., general rubber goods, has let general contract to Olivia Brothers, 410 Union Avenue, for one-story addition, about 100 x 120 ft., for expansion in compounding department. Cost over \$60,000 with equipment. Isador Richmond, 248 Boylston Street, Boston, is architect.

**Southworth Machine Co.**, Portland, Me., printing and perforating machinery and parts, plans rebuilding plant recently destroyed by fire. Loss close to \$400,000 with machinery. Plant recently has been manufacturing aircraft engine parts for government.

**Rice-Barton Corp.**, Tainter Street, Worcester, Mass., machinery for paper and textile mills, has let general contract to E. J. Cross Co., 150 Prescott Street, for one-story addition to be used as a foundry, also for improvements in existing building. Cost close to \$55,000 with equipment.

**General Electric Co.**, Lynn, Mass., is continuing expansion at local works and will build two additions, each one-story, 80 x 364 ft., and 80 x 85 ft., respectively; first noted will be used for general production and other unit for extensions in forge shop. Contract for latter structure has been let to L. R. Porter Co., 126 Park Street, Beverly. Cost over \$135,000 with equipment.

• **Crownshield Shipyard**, Somerset, Mass., idle for several years, has been acquired by new interests headed by William E. Housel and John O'Neill, South Norwalk, Conn. Plant will be remodeled for working force of over 500 men, and will be placed in operation soon.

**American Brass Co.**, Waterbury, Conn., has begun work on one-story addition, 72 x 108 ft., for which general contract recently was let to Torrington Building Co., 187 Church Street, Torrington, Conn. Cost about \$60,000 with equipment.

**Liquidometer Corp.**, 36-16 Skillman Avenue, Long Island City, New York, liquid level gages for tanks, etc., plans new two-story factory at 41-95 Thirty-sixth Street. Cost over \$60,000 with equipment. Charles M. Lobejager, 54-19 Roosevelt Avenue, Woodside, L. I., is architect.

**Production Engineers, Inc.**, 64-25 Admiral Avenue, Maspeth, L. I., tools and precision equipment, has leased one-story building near Brentwood, L. I., and will remodel for production of aircraft equipment for airplane manufacturers in Farmingdale, L. I., district.

**National Can Corp.**, 110 East Forty-second Street, New York, will begin superstructure soon for new one and two-story and basement plant, about 150 x 300 ft., on two-acre tract recently acquired at Aliquippa, Pa., for which general contract has been let to Brown & Matthews, Inc., 122 East Forty-second Street, New York. Cost over \$350,000 with equipment. Company also has made award to same contractor for one-story storage and distributing plant at Sharon, Pa. Cost close to \$125,000 with equipment.

**Board of Education**, 110 Livingston Street, Brooklyn, plans new multi-story high school for aviation trades at New York municipal airport, La Guardia Field, Queens Borough, for advanced students, including shops and other facilities. Cost close to \$1,000,000. Appropriation is being arranged. Architectural Department, Flatbush Avenue Extension and Concord Street, Brooklyn, is in charge.

**Thomson Equipment Corp.**, 169-18 Hillside Avenue, Jamaica, L. I., aircraft parts and accessories, has leased one-story building at Thirty-seventh Avenue and Twenty-second Street, Long Island City, for plant, and will remove to new location and increase capacity.

**Republic Boat Works, Inc.**, recently organized subsidiary of Republic Steamship Co., 17 Battery Place, New York, has purchased a shipyard at 72-35 Elizabeth Avenue, Arverne, L. I., for new shipbuilding and repair plant.

**Jamestown Malleable Iron Corp.**, Tiffany Avenue, Jamestown, N. Y., has let general contract to Warren Construction Co., 335 Steele Street, for one-story addition to main foundry at Falconer, N. Y. Cost close to \$50,000 with equipment.

**J. N. Adam & Co.**, 389 Main Street, Buffalo, department store, plan installation of a conveyor system and other mechanical-handling and loading equipment, elevating apparatus, etc., in five-story building at Eagle and Washington Streets, recently purchased for new warehouse.

**Solvay Process Co.**, Solvay, N. Y., industrial chemicals, has plans for one-story additions to new plant unit for production of phenol and allied specialties. Cost over \$500,000 with equipment. Executive offices are at 40 Rector Street, New York.

**Scintilla Magneto Division**, Bendix Aviation Corp., Sidney, N. Y., magnetos, ignition switches, etc., plans expansion for production of aircraft equipment for government, including additional machinery, to cost about \$645,000. Appropriation will be secured through Defense Plant Corp., Washington.

**Western Electric Co.**, 100 Central Avenue, Kearny, N. J., has leased several one-story buildings, about 95,000 sq. ft. of floor space, on five-acre tract, on Avenue A, Bayonne, N. J., and will improve for new branch works.

**Elastic Stop Corp.**, 2330 Vauxhall Road, Union, N. J., self-locking nuts, etc., has let general contract to Austin Co., Cleveland, for design and erection of one-story addition, 140 x 250 ft. Cost about \$125,000 with equipment.

**Commanding Officer**, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Nov. 10 for drills (Circular 841), high-speed steel hobs (Circular 842), nippers, gages and calipers (Circular 855); until Nov. 12 for power hacksaw machine blades (Circular 875); until Nov. 13 for twist drills (Circular 876).

**International Telephone & Radio Mfg. Co.**, Newark, N. J., has leased three-story building at Verona Avenue and Oraton Street for new plant for manufacture of electrical apparatus.

**E. I. du Pont de Nemours & Co.**, smokeless powder division, du Pont Building, Wilmington, Del., has let general contract to Eastern Construction Co., 705 Greenwood Avenue, Trenton, N. J., for two additions to ammunition cap works at Pompton Lakes, N. J., comprising a one-story structure, 35 x 145 ft., and two-story L-shaped unit, about 65 x 85 ft. Cost close to \$90,000 with equipment.

**Accurate Electro Plating, Inc.**, 3344 North Tenth Street, Philadelphia, metal products, has purchased one-story building, about 15,000 sq. ft. of floor space, on site, 178 x 237 ft., at Eleventh and Westmoreland Streets, for expansion.

**Socony-Vacuum Oil Co.**, 1500 Walnut Street, Philadelphia, and 26 Broadway, New York, plans new bulk oil storage and distributing plant on East Lake Road, Erie, Pa., with main two-story building, 50 x 125 ft., unloading dock, steel tanks, pumping station and other structures. Cost close to \$100,000 with equipment. A. E. Esser, first noted address, is company engineer.

**War Department**, Washington, plans new works for production of high explosives near Brownsville, Pa., to give employment to about

2000 persons. It will be known as Keystone Ordnance Works. Cost over \$10,000,000 with equipment.

**Westinghouse Electric & Mfg. Co.**, East Pittsburgh, has approved plans for one-story addition to transformer-manufacturing works at Sharon, Pa., 160 x 1125 ft., to be used as a tank shop; also for five-story and basement office and operating building, about 60 x 140 ft., at same plant. Cost over \$800,000 with equipment. Contract for first noted structure has been let to Roberts & Schaefer Co., 3885 Beechwood Boulevard, Pittsburgh.

**Reading, Pratt & Cady Division**, American Chain & Cable Co., Inc., Tulpehocken Street, Reading, Pa., steel and bronze valves, electric steel fittings, etc., has plans for one-story addition for expansion in furnace department. Cost about \$50,000 with equipment. Muhlenberg, Yerkes & Muhlenberg, Ganster Building, are architects.

**General Purchasing Officer**, Panama Canal, Washington, asks bids until Nov. 10 for die-stocks, ratchet pipe diestocks, carbon steel hand taps, carbon steel pipe taps, steel drill sleeves, steel drill sockets, 14-in. compass saws, flat-link chain pipe wrenches, adjustable pipe wrenches, hand cross-cut saws, blacksmith's sledge hammers, hand shovels, pipe vices, bench machinists' vices and other equipment (Schedule 5650).

**Fairchild Aircraft Corp.**, Hagerstown, Md., airplanes and parts, subsidiary of Fairchild Engine & Airplane Corp., 30 Rockefeller Plaza, New York, has let general contract to Price Construction Co., Maryland Trust Building, Baltimore, for main one-story addition and auxiliary structures for production of airplane wings for government. Cost about \$1,675,900, fund in that amount to be secured through Defense Plant Corp., Washington.

Albert Kahn Associated Architects & Engineers, Inc., Detroit, is architect and engineer.

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Nov. 12 for 17 gasoline-powered, 4000-lb. telescopic high-lift fork trucks for Eastern and Western Navy Yards (Schedule 9107).

## The South

• **Ethyl Gasoline Corp.**, Baton Rouge, La., tetraethyl lead for high-test gasoline, plans expansion for production of hydrochloric acid as a substitute for chlorine, consisting of several one and multi-story units for processing material noted from common salt and sulfuric acid. Four large furnaces will be installed, with auxiliary equipment. Also will make improvements in present plant, including new steam compressor building, with installation of gas engines and accessories, refrigerating plant and system, additions to research and control structures, and other buildings. Entire project will cost about \$2,400,000 with equipment. Executive offices are at 405 Lexington Avenue, New York.

**Public Works Office**, Naval Operating Base, Norfolk, Va., asks bids until Nov. 12 for two-story incinerator plant, including furnaces and auxiliary equipment, radial brick stack, etc. (Specifications 10619).

**Mississippi Tractor & Equipment Co.**, 301 West Capitol Street, Jackson, Miss., farm tractors and allied equipment, has let general contract to Flint-Jordan Construction Co., 941 College Street, for new one-story shop, 50 x 160 ft., with office and operating building adjoining, 140 x 150 ft. Cost over \$65,000 with equipment. R. W. Naef, 411 East Capitol Street, is architect.

**Cumberland Portland Cement Co.**, Cowan, Tenn., has let general contract to Rust Engineering Co., Martin Building, Birmingham, for



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Mfg. Co., Providence, R. I., U. S. A.

# BROWN & SHARPE

additions for storage and distribution. Cost over \$70,000 with equipment.

**National Electric Coil Co.**, 794 Chambers Road, Columbus, Ohio, electrical products, has let general contract to McCullough & Gibson Co., Bluefield, W. Va., for one-story addition to branch plant at Bluefield. Cost close to \$45,000 with equipment.

**Gulf States Utilities Co.**, Baton Rouge, La., will begin work soon on addition to local steam-electric generating station, to include new turbine-generator unit and auxiliary equipment, high-pressure boiler and accessories; also will enlarge switchyard and make extensions in transmission lines. Cost about \$2,300,000. Main offices are at Beaumont, Tex.

**Guilberson Corp.**, 1000 Forest Street, Dallas, Tex., oil well equipment and supplies, rotary pumps, diesel engines, etc., has let general contract, with authority of Defense Plant Corp., Washington, to Henger Construction Co., Dallas National Bank Building, for new plant near Garland, Tex., for production of radial type diesel engines and parts for military tanks for government. Cost about \$2,411,000, which will be furnished by federal agency noted. J. Gordon Turnbull, Citizens' Building, Cleveland, Ohio, is consulting engineer.

## Central States

• **Aeronautical Corp. of America, Inc.**, Middletown, Ohio, airplanes and parts, has let general contract to William F. Conradt & Son, 14 Millville Avenue, for one-story addition, about 20,000 sq. ft. of floor space. Cost over \$100,000 with equipment. Garriott & Becker, 800 Broadway, are architects; O. W. Motz, 920 East McMillan Street, is consulting engineer, both Cincinnati.

**Buckeye Foundry Co.**, 2800 Beekman Street, Cincinnati, gray iron castings, has let general contract to Dawson-Evans Construction Co., 5300 Vine Street, St. Bernard, Ohio, for one-story addition. Cost about \$40,000 with equipment. William W. Carlton & Associates, 1816 Central Parkway, are architects.

**Cleveland Wire Spring Co.**, East Fortyninth Street and Harvard Avenue, Cleveland, factory equipment, plans one-story addition to sheet metal works. Cost over \$65,000 with equipment.

**Philip Carey Mfg. Co.**, Lockland, Cincinnati, roofing and building products, insulating specialties, etc., plans rebuilding part of Leshner Division plant, Hamilton, Ohio, recently destroyed by fire. Loss close to \$100,000 with equipment.

**Emery Industries, Inc.**, Carew Tower Building, Cincinnati, acids, chemicals, etc., has asked bids on general contract for one and three-story addition to plant at St. Bernard, Ohio, 65 x 156 ft. Cost over \$100,000 with equipment. Tietig & Lee, Inc., 34 West Sixth Street, is architect.

**Cleveland Steel Products Corp.**, 7306 Madison Avenue, Cleveland, universal joints, oil burners and kindred specialties, plans one-story additions, including office structure. Cost over \$250,000 with equipment. George S. Rider Co., Terminal Tower Building, is architect and engineer.

**National Supply Co.**, Springfield, Ohio, oil burners, pipe couplings, engines and other equipment, will begin superstructure soon for two one-story additions, 75 x 230 ft., and 30 x 260 ft., for which T. A. Thompson Construction Co., 340 North Central Avenue, Chicago, is general contractor. Cost close to \$200,000 with equipment. Fred Dolke, 189 West Madison Street, Chicago, is architect and engineer.

**Diamond Alkali Co.**, Oliver Building, Pittsburgh, has arranged with government for proposed metallic magnesium plant at Painesville, Ohio, comprising one and multi-story production units, storage and distributing buildings, power house and other structures. Cost about \$16,000,000, fund in that amount to be furnished by Defense Plant Corp., Washington.

**Standard Oil Co. of Indiana, Inc.**, Whiting, Ind., has asked bids on general contract for three-story addition to local refinery, 60 x 150 ft., to replace structure recently destroyed by

fire. Cost about \$100,000 with tanks and other equipment. Main offices are at 910 South Michigan Avenue, Chicago. J. F. Hansen, last noted address, is company engineer in charge.

**Hosdreg Co., Inc.**, Huntington, Ind., has taken over former industrial works, including one-story shops and other structures, and is modernizing for new plant for production of anti-aircraft projectiles for Navy Department. Cost over \$85,000 with equipment.

**Omar Tool & Machine Co.**, 1828 North Seventeenth Street, St. Louis, has asked bids on general contract for new one-story plant, 75 x 150 ft., at Palm Street and Natural Bridge Avenue. Cost over \$65,000 with equipment. C. G. Weinel, 6635 Delmar Boulevard, University City, Mo., is architect.

**Herman Body Co.**, 4400 Clayton Avenue, St. Louis, automobile bodies, is erecting one-story addition, 50 x 110 ft., for which general contract recently was let to Murch-Jarvis Co., Inc., 111 North Fourth Street. Cost close to \$45,000 with equipment. Hari Van Hoefen, 408 Pine Street, is architect.

**Cardwell Mfg. Co.**, 800 South Wichita Street, Wichita, Kan., oil field winches and kindred products, has approved plans for one-story addition, about 42 x 125 ft., for expansion in main shops. Cost close to \$40,000 with equipment.

**Budd Wheel Co.**, 12141 Charlevoix Avenue, Detroit, pressed steel and wire wheels, has let general contract to Fullerton Construction Co., 11733 Russell Street, for one-story addition. Cost about \$100,000 with equipment.

**Holley Carburetor Co.**, 5930 Vancouver Street, Detroit, plans expansion for production of aircraft equipment for government. Cost close to \$100,000 for machinery, etc., fund in that amount to be provided by Defense Plant Corp., Washington.

**Olds Motor Works Division**, General Motors Corp., Lansing, Mich., has let general contract to Francis J. Corr & Son, Lansing, for one-story addition for expansion in forge shop. Cost over \$70,000 with equipment.

**Odel Tool & Die Co.**, 8820 Grinnell Street, Detroit, dies, gages, tools, etc., plans one-story addition. Cost about \$45,000 with equipment. Frank Eurich, Jr., Detroit Savings Bank Building, is architect.

**Goebel Brewing Co.**, 2001 Rivard Street, Detroit, will begin work soon on two-story addition for storage and distribution. Cost over \$60,000 with equipment. Harley & Ellington, Stroh Building, are architects.

**Briggs Mfg. Co.**, 11631 Mack Avenue, Detroit, has plans for new one and two-story plant, 350 x 1160 ft., with smaller structures, for production of aircraft equipment for government. Cost about \$8,848,500, which will be furnished by Defense Plant Corp., Washington.

**Bastian-Blessing Co.**, Peterson and Rogers Avenues, Chicago, soda fountains, ice cream freezers, etc., has let general contract to Avery Brundage Co., 11 South LaSalle Street, for one-story addition, 80 x 250 ft., for storage and distribution; also for one-story acid-gas house, about 25 x 26 ft. Cost over \$85,000 with equipment. Fox & Fox, 549 West Randolph Street, are architects.

**Barnes Drill Co.**, 814 Chestnut Street, Rockford, Ill., has let general contract to E. W. Schmeling & Sons, Inc., 1031 School Street, for three-story addition, 78 x 80 ft., in part for expansion in machine shop, remainder of space for storage and distribution. Cost over \$65,000 with equipment.

**Rath Packing Co.**, Elm Street, Waterloo, Iowa, meat packer, has let general contract to W. A. Klinger, Inc., Warnock Building, Sioux City, Iowa, for two additions, four stories and basement, 80 x 200 ft., for expansion in processing and packing departments, and three stories and basement, 60 x 168 ft., for cooler house and other service. Cost about \$800,000 with equipment. Henschien, Evers & Crombie, 59 Van Buren Street, Chicago, are architects and engineers.

**Savage Tool Co.**, Savage, Minn., tools, etc., and not Continental Machines, Inc., Minneapolis, as recently incorrectly reported, will build new one-story plant, 80 x 200 ft., at first noted place, for which general contract has

been let to Fischer Brothers, Shakopee, Minn. Cost close to \$85,000 with equipment.

**Fairbanks, Morse & Co.**, 600 South Michigan Avenue, Chicago, has arranged with Navy Department, Washington, for expansion in branch plant at Beloit, Wis., for production of diesel engines for marine service, comprising a main one-story structure, 460 x 660 ft., and auxiliary buildings, to triple present plant capacity. Installation will include machine shop, welding works, assembling department, erecting floor, test department, storage and distribution sections and other divisions. Cost about \$5,500,000. It is understood fund will be furnished by Defense Plant Corp., Washington.

**Wisconsin Hydro-Electric Co.**, Amery, Wis., plans new 1200-kw. diesel engine-generating plant at Clear Lake, Wis. Cost about \$140,000.

## Western States

• **Douglas Aircraft Co., Inc.**, Santa Monica, Cal., has let general contract to Walker Construction Co., 3900 Whiteside Avenue, Los Angeles, for additions to branch plant at Long Beach, Cal., for production of bomber airplanes for government, totaling close to 1,400,000 sq. ft. of floor space. Cost about \$12,620,000 for land, buildings and machinery, fund in that amount to be secured through Defense Plant Corp., Washington. Edward C. and Ellis W. Taylor, 803 West Third Street, Los Angeles, are architect and engineer.

**United States Engineer Office**, 751 South Figueroa Street, Los Angeles, asks bids until Nov. 17 for gasoline-electric standby unit, with switchboard and accessories for Santa Fe dam, Los Angeles County (Circular 101).

**Amalgamated Sugar Co.**, Ogden, Utah, plans new beet sugar mill at Nampa, Idaho, comprising several one and multi-story units for processing and other production, storage and distributing buildings, machine shop, power house and miscellaneous structures. All machinery will be electrically-operated. Cost close to \$2,000,000 with equipment.

**Kalunite, Inc.**, 81 Navajo Street, Salt Lake City, Utah, raw materials, plans two new works at Marysville and Lehi, Utah, respectively, for production of alumina for government. Each will consist of one-story extraction and milling units, storage and distributing buildings, mechanical shop, power station and auxiliary structures. Both plants will cost about \$2,000,000, equally divided, appropriation in that amount to be secured through Defense Plant Corp., Washington.

**Purchasing Agent**, Alaska Railroad, Department of Interior, Federal Office Building, Seattle, asks bids until Nov. 26 for one preparation and coal-washing plant for mine at Eska, Alaska, including lump crusher, raw and washed coal distributing conveyor, gravity bar screen, unit washery, washed coal dewatering and classifying screen, transfer conveyor, centrifugal dryer, washed coal storage bins and bin conveyors, loading chutes, hoppers, motors and controls and auxiliary equipment (Invitation 09422).

## Canada

• **Dominion Foundries & Steel, Ltd.**, Depew Street, Hamilton, Ont., will begin superstructure soon for one-story addition for armor plate production for government, for which general contract recently was let to Canadian Engineering & Contracting Co., Ltd., 25 Hughes Street South. Cost over \$100,000 with equipment.

**Algoma Steel Co., Ltd.**, Sault Ste. Marie, Ont., plans one-story addition. Cost over \$80,000 with equipment.

**Canada Illinois Tools, Ltd.**, 177 Front Street East, Toronto, plans one-story addition. Cost close to \$50,000 with equipment.

**Johnson Wire Works, Ltd.**, 4760 Dagenais Street, Montreal, wire goods and kindred metal specialties, plans one-story addition, about 75 x 315 ft. Cost close to \$100,000 with equipment. J. Pringle & Son, Ltd., 48 South McGee Street, is architect and engineer.



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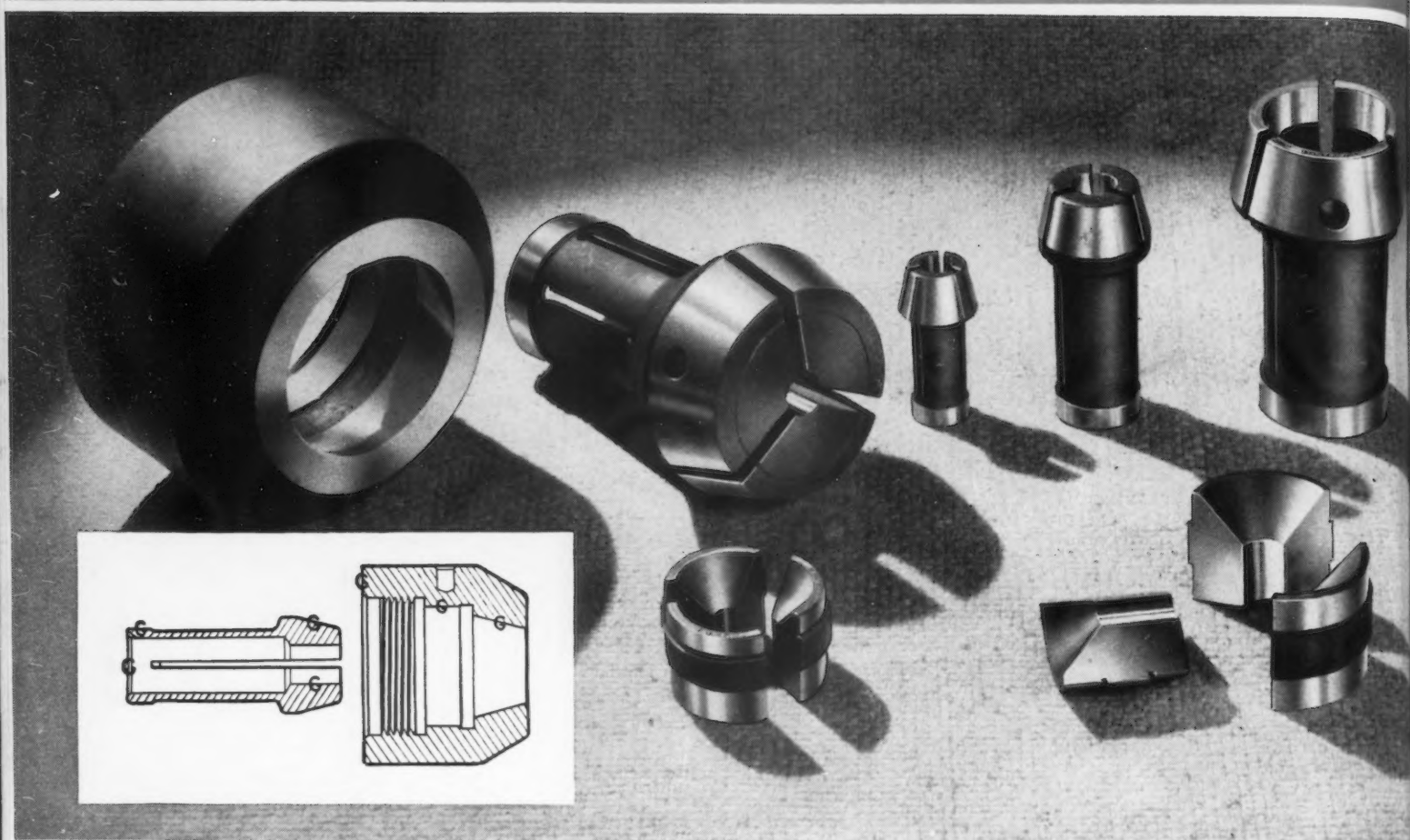
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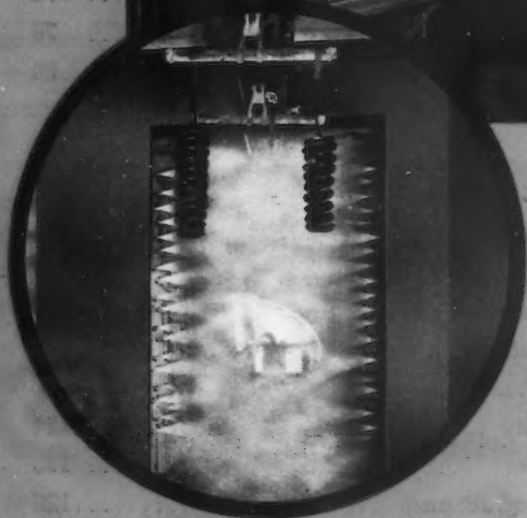
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## Thinking About Tomorrow

THE old proverb: "Sufficient unto the day is the evil thereof" is a comforting thought for the bankrupt who goes to sleep after successfully eluding the sheriff, but it is no motto for the manager of a going concern who intends to keep it going.

I realize quite well that this statement runs counter to the preaching of a considerable section of official Washington thought, which believes that we have no time for thinking about anything except beating Hitler. But most of the boys who are expressing this conviction are either those who never have had any business to manage except other people's or members of the dollar-a-year family who have made their piles, graduated from the school of competitive endeavor and who do not need to worry much about what may happen to the businesses that they formerly ran.

People who have returned from abroad tell me that England and Canada and Australia are certainly going all out to stop Hitler, but that they are planning to do it in the intelligent and not the foolish way. The intelligent way to win a war is to do it without committing suicide.

The British Empire is not in the habit of doing things the foolish way. That is why England, while putting up such a magnificent defense, is still taking time out to think of a future after the war. England intends to win this war and to stay in business after it is over. That is why she is not forgetting to keep alive her foreign as well as domestic trade contacts, nor unnecessarily forcing her non-defense industries out of business through the application of hasty and hysterical priorities.

Certainly Hitler too has a plan for tomorrow. Occupied as he must be in fighting the rest of the world that he has not already conquered or cajoled, he has been keeping his experts busy making the blueprints for after-the-war industry and commerce.

I do not know whether Uncle Sam has made or is making any after-the-war blueprints. If he has any such plans, he is not showing them to his nieces and nephews any more than he is showing his war plans. I will venture to bet, however, that certain influential people in this country and their followers, here and elsewhere, have such a blueprint for America, and that it would look more pleasing to Karl Marx than to George Washington.

And I believe that it is time for the rest of us who do not think along these lines to take some thought for America's after-the-war tomorrow. For if we do not, we may wake up to find that in winning a war we have committed economic suicide.

*J. W. Van Dusen*



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# Nitrogen for Nickel in Cr-Ni Steels

By W. TOFAUTE and H. SCHOTTKY  
Friedr. Krupp A.G., Essen, Germany

Translated by C. M. COSMAN

**R**EMARKABLE physical properties obtainable in Cr-Ni alloys through the substitution of nitrogen for nickel, as attested by this Krupp research that appeared August, 1940, in *Archiv fuer das Eisenhüttenwesen*. Some comparable data have been developed in this country and reported in 1936 by Electro-Metallurgical Co. It would seem that these groups of nitrogen alloys are deserving of even far more attention.

**C**HRONIUM steels can absorb more nitrogen than straight carbon steels and the nitrogen may play the part of carbon. Since nitrogen dissolves to a greater extent in gamma than in alpha iron, it improves the rate of transformation, hardenability and undercooling of the austenite at room temperatures.

Since 1933 American publications have produced evidence that by the addition of nitrogen a semi-ferritic steel containing 18 per cent chromium will be transformed into martensite, and ferritic Cr-steels into a semi-ferritic material with improved mechanical strength, with suppression of grain growth in the annealed or in the welded steel.

The first to note the absorption of nitrogen from the air in high Cr-steels was F. Adcock (*Journ. Iron & Steel Inst.*, 1926, p. 117-26). Later these observations were confirmed by G. Bandel (*Arch. Eisenhütt.*, 1937-38, p. 139-44). At the

time no purely austenitic steels were obtained by the use of a Cr-N<sub>2</sub> combination in steel with or without carbon, nor did the experiments of R. Franks (*THE IRON AGE*, 1933, No. 10, p. 10-13) and E. W. Cobeck and R. P. Garneis (*Journ. Iron & Steel Inst.*, 1939, p. 99-146) lead to pure austenite. Up to now nitrogen contents of some 0.1 per cent have been shown in solid solutions or pearlite in Cr-Ni steels (R. Franks, loc. cit., Houdremont "Sonderstähle," Schottky, et. al.). It was found that these small amounts of N<sub>2</sub> in the steel could influence the properties of the material if the heat treatment was suitably adjusted.

The idea to save Ni by the use of N<sub>2</sub> in Cr-Ni steels is new. It was found that purely or almost exclusively austenitic steels of this system are feasible and they exhibit superior properties when

compared with austenitic or ferritic steels containing less Ni or N<sub>2</sub>.

Two series of steels were prepared: 50-kg. lots containing 23 per cent Cr, 1 to 5 per cent Ni and 0.06 per cent C, and 50-kg. ingots with 0.25 to 0.30 per cent N<sub>2</sub> in addition to the above compositions. These lots were melted from pure raw materials in the laboratory and later 1 to 1.5 tons of the alloy were produced in the plant's high frequency furnace, using scrap in the usual manner. Ferrochromium additions furnished the nitrogen. The ingots were forged into billets and rolled into sheets.

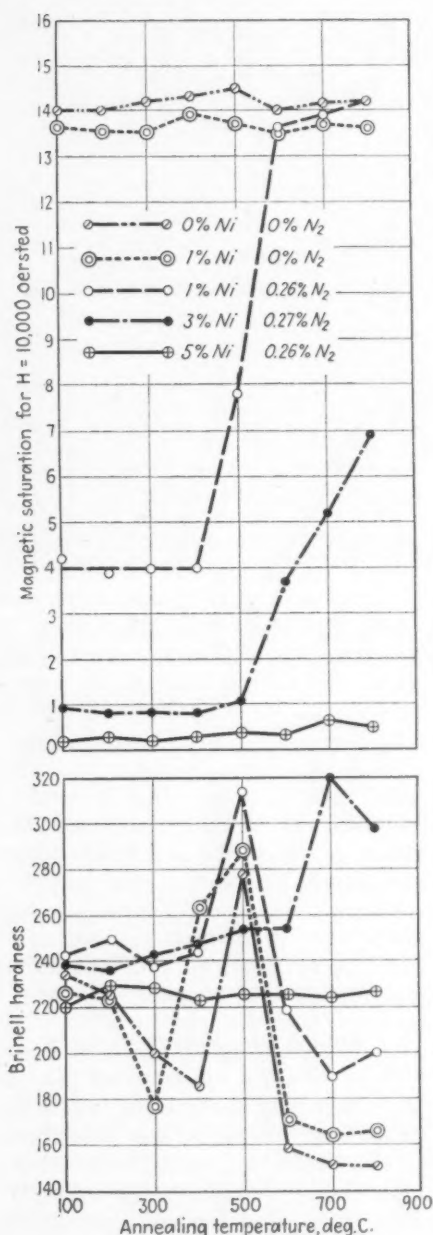
## Results of Laboratory Tests

The relative amounts of Ni and N<sub>2</sub> required to produce austenite were determined by the production of a series of steels which were quenched from 950 or 1100 deg. C. and tested for hardness, magnetic

TABLE I  
Influence of Nitrogen and Nickel Additions on Hardness and Magnetic Saturation of a Steel with 0.06 C and 23 Cr After Water Quenching from 950 and 1100 Deg. C.

Quenching Temperatures, Deg. C.	Nickel and Nitrogen Contents, Per Cent				
	0 Ni 0 N <sub>2</sub>	1 Ni 0 N <sub>2</sub>	1 Ni 0.26 N <sub>2</sub>	3 Ni 0.27 N <sub>2</sub>	5 Ni 0.26 N <sub>2</sub>
	Magnetic Saturation in Gauss (H = 10,000 Oersted)				
950	14,300	13,650	9,750	1,250	470
1100	14,325	13,700	4,750	975	250
	Brinell Hardness (5 mm. Ball, 750, Kg.)				
950	136	177	229	260	262
1100	230	230	240	232	235

saturation, and micrographic structure. These results are given in Table I. The steel with 23 per cent chromium is purely ferritic and not influenced in its magnetic properties by quenching. The addition of 1 per cent Ni does not change this picture. Quenching



**FIGS. 1 and 2**—Influence of annealing for 500 hr. at 100 to 800 deg. C. upon Brinell hardness and magnetic saturation of steels with 23 Cr, 0 to 5 Ni and 0 to 0.30 N<sub>2</sub>. Test pieces were quenched from 1100 deg. C. before annealing.

from 1100 deg. C. results in a limited martensite formation. But on addition of 0.25 per cent N<sub>2</sub>, a considerable reduction in the magnetic saturation is effected and the austenite content can be estimated

at 30 per cent in the specimen quenched from 950 deg. C. and at 60 per cent in the one hardened at 1100 deg. C. When the nickel content was increased to 3 per cent, the austenite percentage rose to 90, and in the alloy containing 0.25 per cent N<sub>2</sub> and 5 per cent Ni, an almost wholly austenitic structure was noted.

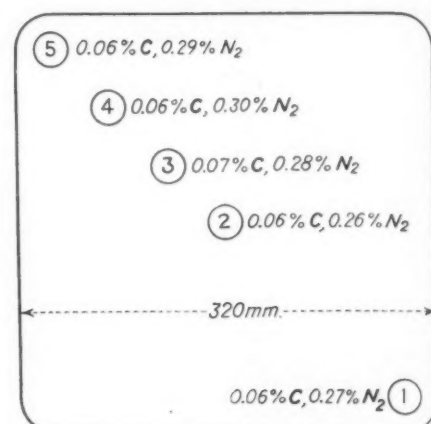
By comparison a nickel content of about 13 per cent would be required to give pure austenite with an equal chromium content in an alloy free from N<sub>2</sub>, as shown by F. Wever and W. Jellinghaus (*Mitt. K. W. Inst. Eisenhütt.*, 1931, p. 93-108) and C. H. M. Jenkins and co-workers (*Journ. Iron & Steel Inst.*, 1937, p. 187-222).

The stability of the austenite was tested by annealing specimens (quenched from 1100 deg. C.) up to 500 hr. in the temperature range from 100 to 800 deg. C. While some changes in hardness and magnetic saturation were observed in the lower alloys, the material with 5 per cent Ni, 0.26 per cent N<sub>2</sub>, is stable towards heat treatment: the austenite does not disintegrate. The other alloys experience a more or less complete change from austenite to ferrite and the 3 per cent Ni alloy has a limited austenite stability.

It must be emphasized that steels of 23 per cent Cr, 1 Ni and 0.26 per cent N<sub>2</sub>, while they contain large percentages of austenite, lose it completely on tempering under formation of ferrite and carbide. In alloys with 3 per cent Ni, the austenite is not completely stable and disintegrates partially and slowly forms martensite. In corrosion-resisting steels where only short periods of heating to higher temperatures need be considered, e.g., in welding, the 3 per cent Ni steel may be sufficiently stable, since it is fully adequate for temperatures below 500 deg. C. By the increase of Ni to 5 per cent complete stability is achieved. This alloy will not experience structural changes even after extended annealing and therefore no embrittlement will take place.

Mechanical properties were next investigated. As shown in Table II, the tensile strength of ferritic alloys without N<sub>2</sub> is low at comparatively favorable yield and elongation values. The addition of 0.26 per cent N<sub>2</sub> to 1 per cent Ni steel increases the elastic limit by 21,000 lb. per sq. in. The tensile

strength increases much more and is almost doubled. This may be attributed to the martensite produced by cold work. Hence the elongation is smaller, although not materially, than in the nitrogen-free steel. Due to the high austenite content in the 4 per cent Ni, 0.27 per cent N<sub>2</sub> steel, elongation increases considerably with the elastic limit, but the ultimate tensile is reduced. The properties of the alloy are similar to heat-treated Cr-steels except for the



**FIG. 3**—Analysis of the cross-section of an ingot (320 mm. side) with 0.06 C, 0.40 Si, 4.13 Ni, 1.05 Mn, 22.5 Cr, and 0.29 N<sub>2</sub>, concerning the possible C and N<sub>2</sub> segregation. Figures show position of sample in the ingot.

ultimate tensile strength. The elongation is almost equal to the well known soft austenitic steels.

#### Performance of Nitrogen Steels

The melting of nitrogen-bearing steels in the 1-ton high frequency furnace proceeded without any particular difficulties. The cross-section of an ingot did not reveal divergencies in the C or N<sub>2</sub> content which were not in keeping with the accuracy of the analytical method. Steels behaved well under the hammer and in the rolls.

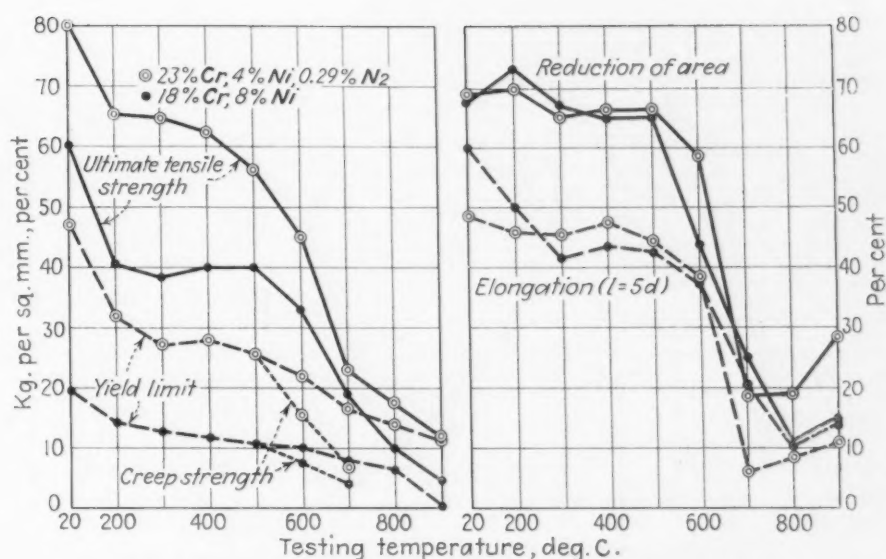
In Table III tensile values are collected for steels with 3, 4, and 5 per cent Ni and about 0.26 per cent N<sub>2</sub>, water quenched from 1100 and 1150 deg. C. Those specimens which had been welded gave almost identical results.

The arc welded specimens exhibit very good values no matter whether the weld seam had been worked off or not. This unexpected performance may be at-



tributed to the fact that the seam absorbs nitrogen from the air during arc welding and also enriches itself by taking  $N_2$  from the material. Elongation of about 20 per cent at 114,000 lb. per sq. in. ultimate tensile is highly satisfactory. Also, bending tests proved very good and no cracks were observed on the 180-deg. bend, disregarding one exception. The table also shows the values obtained using an electrode of the parent metal. Here a further improvement in tensile values may be noted in comparison with specimens welded with 18 and 8 electrode, while no change in the elongation values took place. Nitrogen has a favorable influence upon the transition zone from the welding seam to the sheet. The nitrogen addition completely eliminates the coarse grained transition zone.

In order to make possible an immediate comparison with known austenitic Cr-Ni steels, Table IV shows in juxtaposition tensile and impact strength as well as Erichsen deep drawing test values. It is found that 23 per cent Cr, 4 Ni, 0.29  $N_2$  has an ultimate tensile of 28,500 and a yield strength of 43,000 lb. per sq. in. above the values for 18 and 8 steel, and at the same time there is no considerable loss in elongation. While the notch impact strength is only inconsiderably below 18 and 8 performance, the Erichsen deep drawing test results amount merely to 75 to 80 per cent of 18 and 8 steel. Compared with the 22 per cent Cr, 7 Ni, 0.25 C steel (C is high, but steel is otherwise similar) a higher impact value is noticed and a much improved yield. As seen in Figs. 4 and 5, the advantages in yield and tensile of the nitrogen bearing steel compared with the 18 and 8 are retained at elevated temperatures. Also, the fatigue limit is well above that of the low carbon 18 and 8 steel. However,



FIGS. 4 (left) and 5—Creep strength of steel with 23 Cr, 4 Ni and 0.29  $N_2$ , in comparison with a steel containing 18 Cr. and 8 Ni.

this steel is hardly used in applications demanding a high fatigue strength.

Differences in tensile strength between the two steels persist in cold work up to at least 40 per cent deformation, while the elongation remains practically constant

(Figs. 6 and 7). That is to say, a steel of 4 per cent Ni, 0.29  $N_2$  can pull 207,000 lb. per sq. in. following cold rolling and produce an elongation of over 10 per cent. Fig. 8 completes these figures by a comparative representation of tension-extension curves. These curves

TABLE II

Results of Tensile Tests on Sheets of 6 mm. Thickness, Made of Steel Containing 23 Per Cent Cr, Varying Amounts of Ni, With or Without  $N_2$

Additions, Per Cent		Quenching Temperature, Deg. C.	Yield Strength, Lb. per Sq. In.	Ultimate Tensile, Lb. per Sq. In.	Elongation, Per Cent, $l = 5.65 \sqrt{\text{Area}}$
Ni	$N_2$				
0	0	900	51,000	66,000	33.9
1	0	900	59,000	70,000	23.6
1	0.26	950	77,000	133,000	19.3
4	0.27	1100	85,000	123,000	44.9

TABLE III

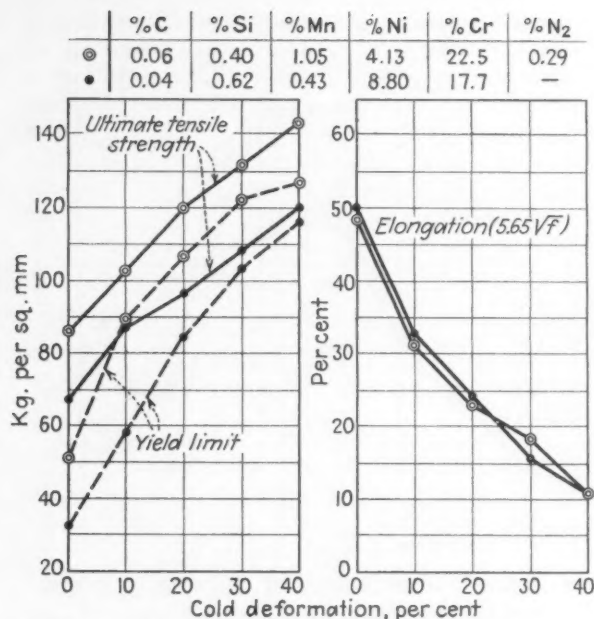
Mechanical Properties of Sheets of 6 mm. Thickness Made from Nitrogen Steels with 23 Cr and 3 to 5 Ni, Unwelded and After Arc Welding (Mean of three tests)

Additions, Per Cent		Sheets Quenched from Deg. C.	Tests Without Weld		
Ni	$N_2$		Yield Limit, Lb. per Sq. In.	Ultimate Tensile, Lb. per Sq. In.	Elongation, Per Cent
3	0.29	1100	82,500	126,000	48.2
4	0.29	1100	81,000	117,000	50.0
5	0.28	1150	80,000	120,000	48.0

TEST PIECES ARC WELDED

Additions, Per Cent		Sheets Quenched from Deg. C. <sup>1</sup>	Elec- trode <sup>2</sup>	Welding Seam Left <sup>1</sup>				Welding Seam Worked Off <sup>2</sup>			
Ni	$N_2$			Yield Limit, Lb. per Sq. In.	Ultimate Tensile, Lb. per Sq. In.	Elonga- tion, Per Cent <sup>3</sup>	Angle in Bend Tests, Deg.	Yield Limit, Lb. per Sq. In.	Ultimate Tensile, Lb. per Sq. In.	Elonga- tion, Per Cent <sup>3</sup>	Angle in Bend Test, Deg.
3	0.29	1100	a	84,000	126,500	42.5	180	81,000	118,000	22.0	180
4	0.29	1100	a	83,500	124,000	37.0	180	85,000	111,000	16.0	145, 180, 180
			b	90,000	119,000	31.0	...	94,000	121,000	18.4	...
5	0.28	1150	2	76,500	120,000	40.4	180	80,000	114,500	21.6	180

<sup>1</sup> Fracture always in sheet. <sup>2</sup> Fracture always in welds. <sup>3</sup> a = 18 and 8 steel low in C; b = 23 Cr, 4 Ni, 0.29  $N_2$ . <sup>4</sup> The welded test pieces were not heat treated. <sup>5</sup>  $l = 5.65 \sqrt{\text{area of cross section}}$ .

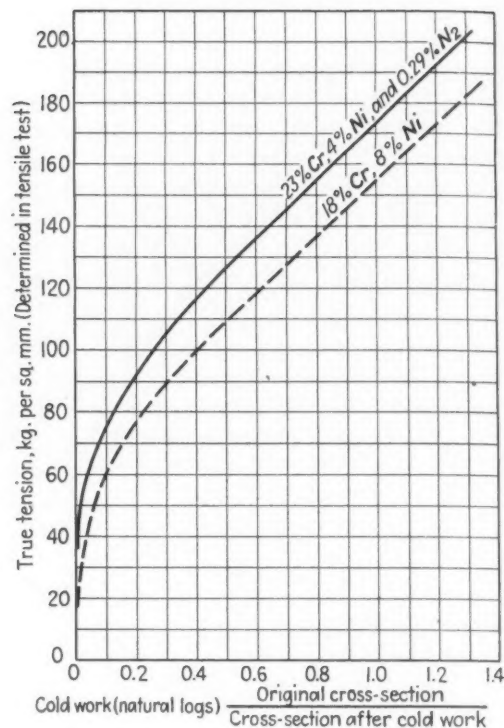


**FIGS. 6 (left) and 7—Influence of cold deformation upon the tensile properties of steel with 23 Cr, 4 Ni and 0.29 N<sub>2</sub>, in comparison with 18 and 8 steel.**

make yet clearer the similarity between the two alloys as regards work hardening.

Nitrogen bearing steels are even less inclined to form ferrite under cold work than 0.10 per cent C 18 and 8 steel which has a magnetic saturation of 3400 Gauss after 30 per cent cold deformation. (P. Schafmeister and A. Gotta: Arch. Eisenhüttenwes., 1931, 32, p. 427-30). This means that a considerable amount of ferrite is formed, while according to Table V, only the steel poorest in Ni of the three

nitrogen bearing alloys shows a noticeable increase in magnetic saturation after a cold deformation of 30 per cent. If past experience can be used, then the conclusion appears justified from Table V that these materials can be used for deep drawing operations. Practical tests have borne out this assumption: kitchen sinks of 200-mm. depth were manufactured from this material and the number of intermediate annealings did not exceed that required for 18 and 8 steel. Therefore yield and tensile



**RIGHT**  
**FIG. 8—Work hardening of steel with 23 Cr, 4 Ni and 0.29 N<sub>2</sub>, in comparison with steel containing 18 Cr and 8 Ni.**

**TABLE IV**  
Comparison of Tensile Values of Nitrogen Bearing Steel with 23 Cr and 4 Ni with Those of Corrosion Resisting Steels Richer in Nickel

Steel with	Yield Limit, Lb. per Sq. In.	Tensile Strength, Lb. per Sq. In.	Elongation, l = 5d, Per Cent	Impact Strength, Ft.-Lb. per Sq. In.	Erichsen Deep Drawing Value, in mm.	
					1-mm. Sheet	2-mm. Sheet
18 Cr and 8 Ni . . . . .	34,000	88,000	60	0.537	13	14
0.25 C, 22 Cr, 7 Ni . . . .	45,500	111,000	47.5	0.428	11	12
23 Cr, 4 Ni, 0.29 N <sub>2</sub> . . . .	81,000	117,000	50	0.472	10	11

**TABLE V**  
Magnetic Saturation of the Annealed and the Cold Rolled Nitrogen Bearing 23 Cr and 3 to 5 Ni Steel

Additions, Per Cent	Ni	N <sub>2</sub>	Quenching Temperature, Deg. C.	Magnetic Saturation in Gauss (H = 10,000 Oersted)	
				Annealed	Annealed and Cold Deformed by 30 Per Cent
3	0.29		1100	1250	2665
4	0.29		1100	550	740
5	0.28		1150	100	245

strengths of the 23 Cr, 4 Ni, 0.29 N<sub>2</sub> alloy permit deep drawing operations in spite of low Erichsen values.

Embrittlement is measured by the notch impact after annealing up to 1000 hr. at between 100 and 900 deg. C. (Fig. 9). These values remain within fairly good limits. Impact strength is lowest after annealing at 500 deg. C., but it does not drop below 5 kgm. per sq. cm. It may be noted that after 1000 hr. the values actually recovered somewhat from their low. With the 18 and 8 steel a minimum is reached at 800 deg. C. annealing temperature (B. Strauss, H. Schottky, J. Hinnüber, Z. anorg. Chem. 188, 1930, p. 309-24). In the alloy under consideration this minimum lies at the somewhat lower temperature.

Corrosion resistance of the nitrogen bearing Cr-Ni steels was first investigated in boiling 50 per cent HNO<sub>3</sub>. While in the absence of Ni, nitrogen was detrimental to the stability of steels exposed to HNO<sub>3</sub>, it did not exert a deleterious influence upon the corrosion resistance of steels containing over 3 per cent Ni (Table VI). These materials had practically the same weight loss at 18 and 8. Furthermore, the observation was remarkable that weight losses of Cr-Ni-N<sub>2</sub> steel diminished with the duration of the experiment in spite of the low Ni content, while steels of an equal Cr content and ferritic structure in



general have increasing weight losses. The corrosion resistance is largely independent of the heat treating temperature (Table VII). This fact is important in welding.

Investigations into the corrosion resistance toward  $H_2SO_4$ ,  $HNO_3$  mixtures show clearly that the nitrogen bearing steels with 23 per cent Cr and 3 to 5 per cent Ni are more stable than 18 and 8 steel.

Since stainless steels are often used in Cl-solutions, pitting tests were performed. Ten to 20 per

TABLE VI  
Weight Loss of Nitrogen Bearing Steels with 23 Cr and 3 to 5 Ni, in Nitric and in Mixed Acids, Compared with 18 Cr and 8 Ni Steel

Additions, Per Cent Ni N <sub>2</sub>	Quenching Temperature, Deg. C.	Weight Loss in Gm. per Sq. m. per Hr. in Boiling 50 Per Cent HNO <sub>3</sub>			In Mixed Acids After 150 Hr.	
		1 to 50 Hr.	51 to 150 Hr.	150 to 250 Hr.	a	b
3 0.29	1100	0.21	0.16	0.14	0.07	0.08
4 0.29	1100	0.18	0.15	0.12	0.06	0.06
5 0.28	1150	0.17	0.13	0.12	0.05	0.07
8 18 Cr	1100	0.15	0.12	0.10	0.18	0.18

a = 50 per cent by volume  $H_2SO_4$ , 20  $HNO_3$ , 30  $H_2O$ .  
b = 60 per cent by volume  $H_2SO_4$ , 20  $HNO_3$ , 20  $H_2O$ .  
Temperature of mixed acids was 80 deg. C.

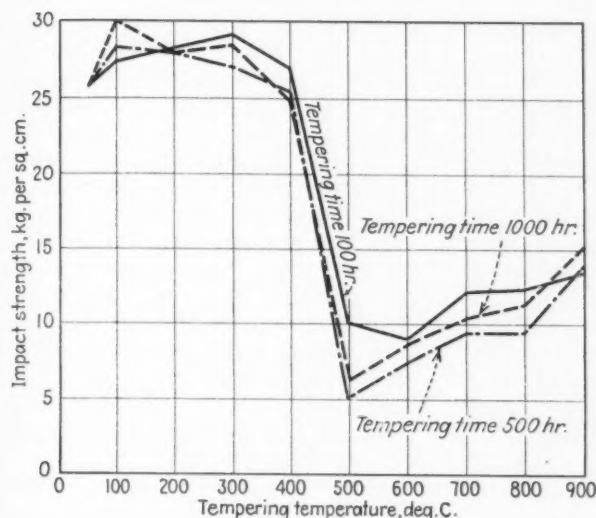


FIG. 9—Influence of the tempering temperature and time on impact resistance of steel with 0.06 C, 0.40 Si, 1.05 Mn, 4.13 Ni, 22.5 Cr and 0.29 N<sub>2</sub>. Test pieces have 10 x 10 x 55 mm. dimensions with a 3-mm. notch of 2-mm. diameter, and were water quenched from 1100 deg. C. and quenched in water after tempering.

cent  $FeCl_3$  solution was used, as is customary for this test, and the nitrogenous steel was found to be considerably more resistant to pitting than 18 and 8 material.

To test for intercrystalline corrosion 6-mm. sheets of the steel were arc welded together with 18 and 8 and boiled in the usual  $H_2SO_4/CuSO_4$  solution for 200 hr. and for the tested range between 0.04 and 0.07 per cent C, complete

resistance toward this type of attack was proved.

#### Conclusion

A practically pure austenitic structure can be produced by nitro-

gen and the limited addition of nickel in Cr-steels containing less than 0.1 per cent C. In the alloy with 0.05 per cent C and 23 Cr at about 4 per cent Ni and 0.25 N<sub>2</sub> a sufficiently stable austenite was obtained to outlast annealing as well as cold deformation. These nickel-saving nitrogen-bearing Cr-steels are technologically remarkable by their high yield point and high degree of deformability, as shown by results achieved with sheets and rods. They combine the advantages of the martensite-troostite steels with those of the austenitic Cr-Ni steels, and are also suited for deep drawing. Weldability and strength in welds without subsequent heat treatment are very good. Hot work offers no particular difficulties.

Stability in oxidizing acids and chloride solutions is equal to or better than that of 18 and 8 steels. No tendency was noted toward intercrystalline corrosion.

TABLE VII

Influence of Previous Heat Treating Upon Stability of Nitrogen Bearing Steels with 23 Cr, 3 to 5 Ni in 50 Per Cent Boiling  $HNO_3$  (Change of acid after each 50 hr.)

Additions Per Cent Ni N <sub>2</sub>	Quenching Temperature, Deg. C.	Weight Loss in Gm. per Sq. M.			
		1 to 50 Hr.	51 to 150 Hr.	151 to 250 Hr.	251 to 350 Hr.
3 0.29	850	0.25	0.20	0.21	0.19
	1150	0.18	0.16	0.16	0.14
	1350	0.20	0.18	0.19	0.21
4 0.29	850	0.17	0.21	0.13	0.14
	1150	0.08	0.10	0.11	0.12
	1350	0.11	0.12	0.15	0.14
5 0.28	850	0.17	0.17	0.14	0.13
	1150	0.10	0.10	0.11	0.11
	1350	0.10	0.10	0.12	0.12

## Ear Defenders Increase Worker Efficiency

FATIGUE, irritability and nervous exhaustion experienced by workmen in or about noisy operations are lessened by the use of Ear Defenders, developed by the Mine Safety Appliances Co., Pittsburgh. Ear Defenders reduce loud noises by 35 to 45 decibels, or to about 1/10 of their original volume, enabling workmen to better concentrate on their job and thereby increasing their efficiency yet are so designed that warning signals and conversation can be easily heard.

Designed by Dr. Vern O. Knudsen, professor of physics, University of California, Los Angeles, and an authority on acoustics, and Dr.

Carey P. McCord, medical director of the Industrial Health Conservancy Laboratories, Detroit, these devices fit snugly in each ear and are easy to insert and remove. Ear Defenders are tapered tubes molded from surgical-type soft rubber, consisting of two barriers, an outer one of metal and an inner one of soft rubber, separated by an air space. The tapered construction of the devices prevent any danger of contact with the ear drum.

Ear Defenders can be easily cleaned with soap and water, insuring sanitation, and are packed in a plastic pocket carrying container that will keep them clean when not in use.

# Open Hearth

**L**AST week attention was directed to experience in the several plants using basic construction in open hearths. Detailed data were given for the roof construction, slag pockets, mortar to use, etc. Checker data are as follows:

Assuming the checkers are not burned down by excess temperature, which usually represents bad combustion, the failure of the checkers and the necessity for stopping the furnace are due to their clogging from deposits of iron oxide carried over with the outgoing gases. This carryover is almost pure iron oxide and has a softening temperature between 2350 deg. and 2400 deg. F. If this temperature is not exceeded on the top course of checkers, the accumulation can be blown off the bricks by compressed air or steam while the furnace is in operation, thereby keeping the checkers clean and the flues open.

When checkers are laid with straight, continuous flues from top to bottom, without cross flues, the only accumulation of oxide will be

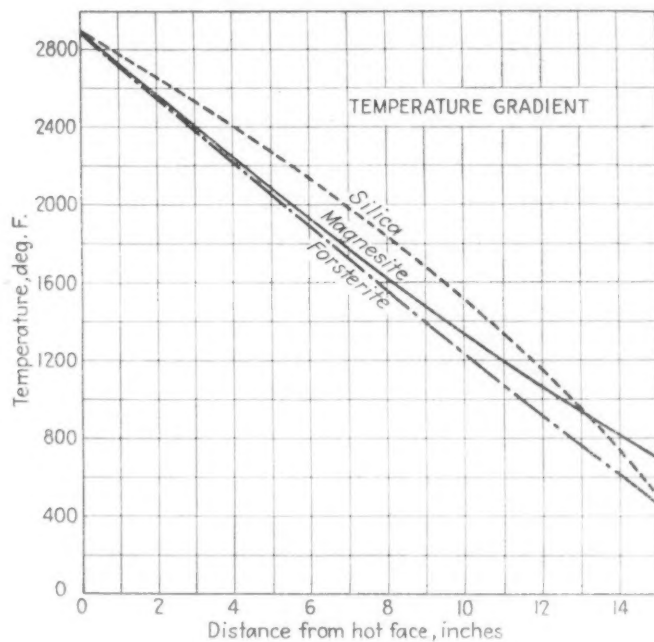
on the top course. Therefore, when the top course has been cleaned, the entire checker work is clean.

## Checker Temperature Control

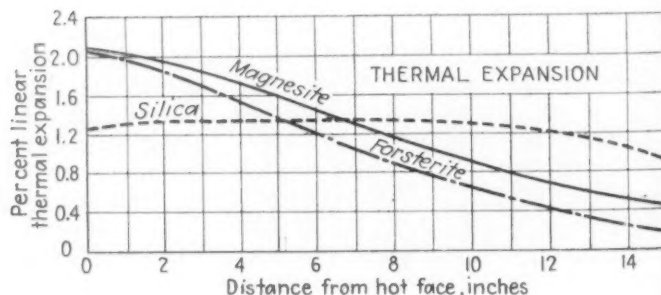
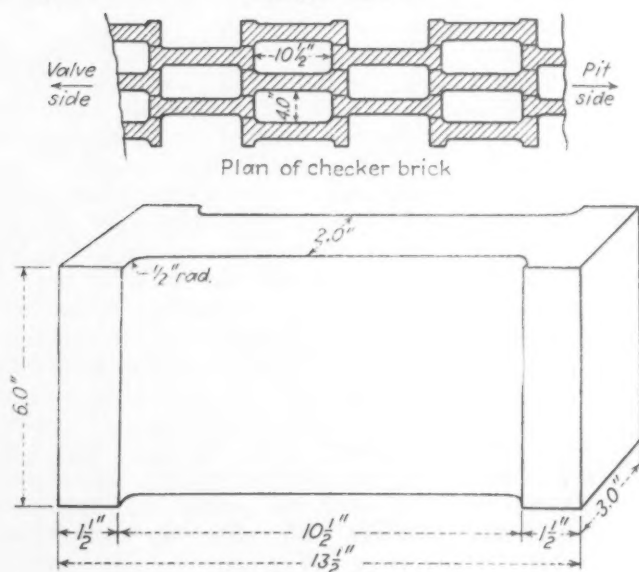
Temperature differential controls now used for indicating proper reversal times give no protection against exceeding a maximum allowable temperature on the top course. A proper differential can be maintained by these controls with the maximum temperature at one or both ends exceeded. Also, the location in the checkers of this differential instrument is such that there is considerable lag in temperature between the top course and the indicated temperature.

For several years the writer has successfully used a simple arrangement for avoiding excess temperature, which consists of a 6 in. pipe through the charging floor and through the checker chamber roof, on the top of which is fitted a lid that is opened and closed by a foot lever so that the furnaceman can readily look at his checkers to determine the top temperature. See Fig. 3. Twenty-three hundred to 2400 deg. F. is, fortunately, a temperature which can readily be recognized by sight. It is the point at which the outline of the bricks can no longer be clearly seen by the naked eye. If the maximum temperature is approached, the furnace

**FIG. 15—**Calculated temperature gradient, and thermal expansion (below) through 15-in. roof brick for hot face temperature of 2900 deg. F.



**FIG. 14—**One way of building checkers with straight flues.





# h With Basic Roof

By LEWIS B. LINDEMUTH  
Consulting Engineer, New York

is reversed. When top temperatures do not exceed the melting point of the oxide deposit, checker lives are maintained up to four or five years, or even more. This same visual arrangement permits observation of the cleanliness of the checkers and can be used for determining the necessity for blowing, where this is not otherwise systematically provided for.

## Checkers

There are several common ways of building checkers with straight flues. The writer prefers the arrangement shown in Fig. 14, as it produces an opening in which it is believed the column of air is more readily heated than in other arrangements. The most efficient checker would probably be one with very narrow slots for openings, but the narrowness is limited by the time it takes for them to become clogged. In no case during the normal periods of reversal are more than 2 in. of brickwork effective in absorbing or giving out heat. If checkers were laid up from 2 in. thick standard bricks in the same manner, the opening could be only 2 in. wide, which would clog too rapidly. With the 4 in. opening as shown, the checkers should be blown about every two weeks.

## Checker Runners

With the regular blowing of checkers, the entire accumulation of oxides is deposited in the runners below the checkers. This will eventually clog up the runners, the time depending upon the height of the rider walls. Most furnaces are built today with an insufficient depth of checkers. It is not, therefore, desirable to have higher rider walls in order to prolong the operating period as this still further lessens the depth of checkers and lowers the fuel efficiency, and speed of heats.

In the case of the basic furnace where a continuous operation of 18

months is necessary, arrangements must be made for cleaning the runners without stopping the furnace. No existing furnace other than those in Australia could accomplish this. Fig. 3 shows how this has been done.

Most furnaces have been built with the elevation of the bottom of the slag pockets 5 ft. to 10 ft. higher than the elevation of the bottom of the checker chambers. Generally the concrete foundation has followed the elevation of the bottom of the slag pocket back to the checker chambers, then down to the bottom of the checker chambers and at that level to the flues.

In the last three new furnaces in Australia, the concrete foundation has been carried at the level of the bottom of the checker chambers through to the pit side and then up to the pit floor level and the bottoms of the slag pockets are supported on I-beams. This creates tunnels under the slag pockets from the pit side to the bottom of the checker chambers.

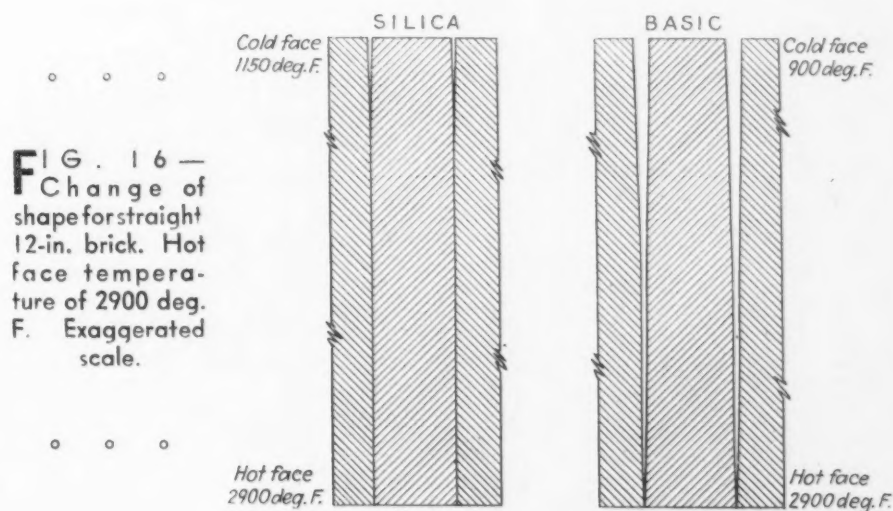
The purpose of these is to make it possible to clean out the runners under the checkers without interfering with the operation of the furnace. To accomplish this, bulkheads in the checker chambers are

opened at the runners, one at a time, and the accumulation scraped out with rabblers. It could also be removed mechanically because at this point temperatures are never much in excess of 1200 deg. F.

If these accumulations are removed, say once a month, or at the same time that the slag pocket accumulations are removed, there is never sufficient material to make it a hardship. Working in these tunnels is not difficult as there is ample headroom and when the bulkheads are opened, there is a draft of air from the pit side, either to the stack or to the furnace, according to which end the furnace is on. This draft prevents any uncomfortable temperature.

In the first furnace which was built this way, the entrances to these tunnels were closed on the pit side and, during the intervals when the tunnels were not being used, the temperature in the tunnels would rise to about 190 deg. F. This was about the limit of temperature which a man could stand long enough to open the bulkheads into the checker runners.

To overcome this, an iron door was placed in one of the bulkheads in each chamber which is operated by a cable from outside of the



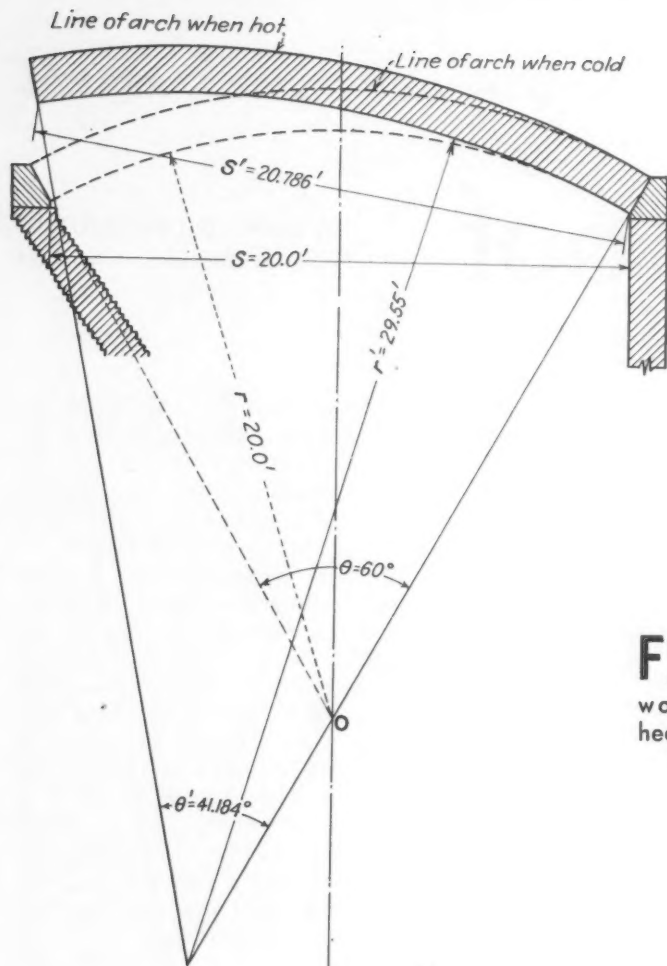
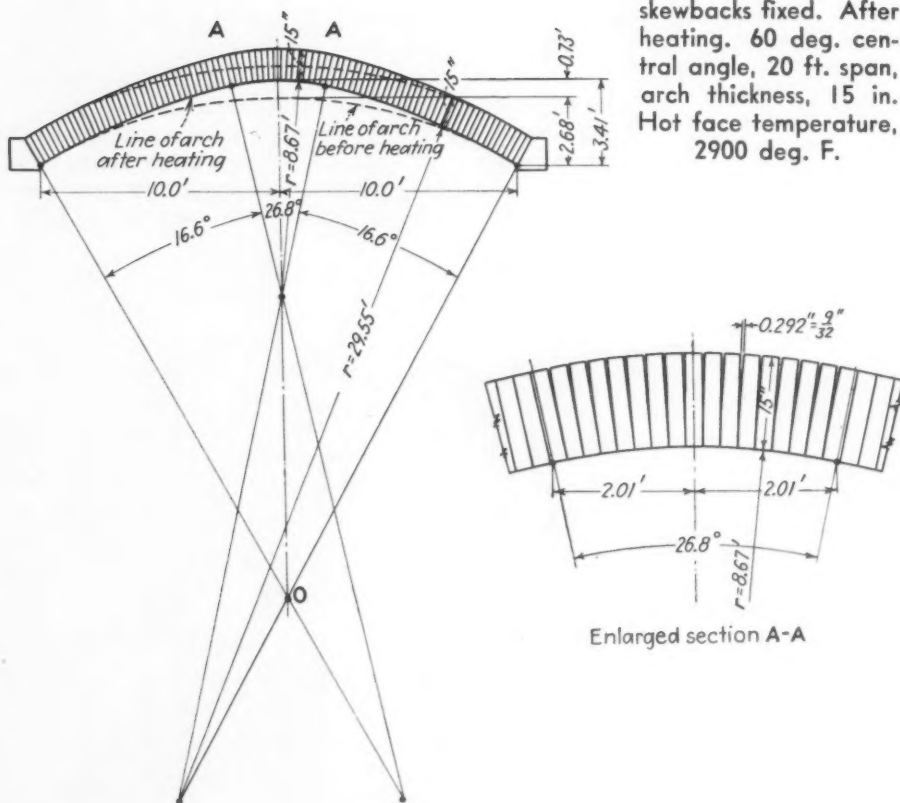


FIG. 17—Shape that a forsterite roof would take when heated, assuming one fixed skewback.



Enlarged section A-A

tunnel. This causes a draft of cool air through the tunnel before it is necessary for men to enter.

The last three furnaces to have been built at the Australian Iron & Steel Co. at Port Kembla, N.S.W., which are approximately 250-ton stationary furnaces, have incorporated this feature.

This was done in anticipation of these furnaces being entirely of basic bricks, although at the present time there are no suitable bricks available for the basic roof construction. However, these tunnels have been very effective even with the silica construction, have prevented a slowing of production and, on several occasions, a shut-down because of the accumulations under the checkers.

#### Flues

As a matter of interest, these same three furnaces have maintained the floor level of the flues and valves at the floor level of the bottom of the checkers. At convenient intervals bulkheads have been arranged in the flues so that they may be cleaned and valve seats cleaned or welded if leaking, again, without interfering with the operation of the furnaces. These three furnaces can be maintained at maximum production without shutdowns for minor repairs during the life of the roof, regardless of the length of time such roof lasts.

#### Skewback Support

Another common source of failure, which causes delays for repairs, is the back skewback support. In some plants these hardly last for the life of a silica roof and a number of places have resorted to water-cooling along the lower flange.

Water is more fatal to basic bricks than it is to silica and leaks in the cooling pipes would quickly disintegrate a portion of the basic skewback bricks. Where water cooling is satisfactory for a continuous operation of six months, it may be entirely inadequate for 18 months.

On some of the furnaces with which the writer has been associated, use has been made of heavy 20 in. I-beams taken from the rolling mill when the web was  $1\frac{1}{8}$  in. or  $1\frac{1}{4}$  in. thick. The loose basic material placed between the furnace walls and the roof has been carefully scraped away so that the entire flange of the I-beam has been exposed to the air. This has



been fairly satisfactory so long as constant attention is paid to keeping the flange uncovered.

#### Notched Buckstays

The last furnace to be built in Australia has a feature which it is hoped will permanently overcome any difficulty from this source. See Fig. 3.

The back buckstays are notched to permit the skewback support to be located outside of the furnace entirely. The roof is, therefore, sprung from a point outside of the outside line of the furnace wall and the skewback support is, therefore, completely exposed to the outside air.

The furnace with this arrangement has been in operation only about three months and it is too soon to draw conclusions, but there are high hopes for excellent performance.

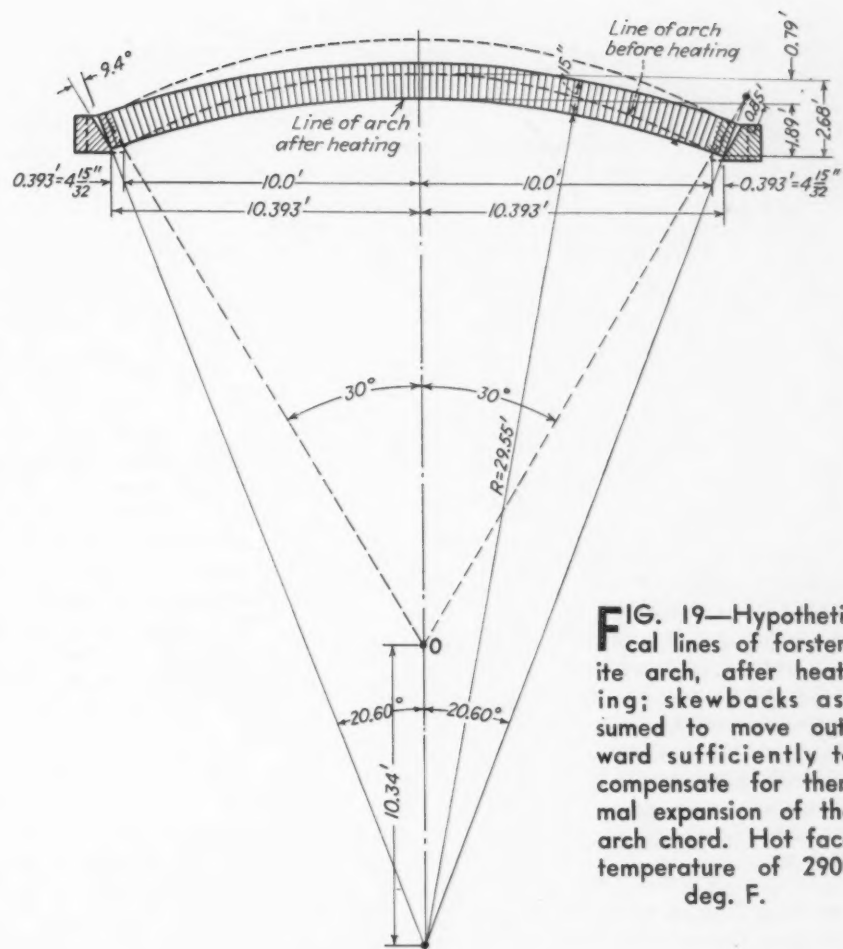
#### General Design

No furnace has yet been built with all of the features that have been described as being important for the best production. But all of the features have been built into furnaces in anticipation of the availability at some future date of the proper kind of basic bricks which have been very helpful on silica roof furnaces.

In building new open hearth furnaces today, this almost certain development of the near future should be provided for in the design. The spacing of buckstays, their length, cross binding, the arrangement of foundations and flues, cost little or nothing more in a new furnace and detract nothing from its operation as a silica furnace. To alter an existing furnace may or may not be costly, depending largely upon chance locations of now comparatively unimportant details. Furnaces not so provided for may find themselves obsolete almost as soon as completed.

All furnaces with basic roofs, which have been successful over the past six or seven years, have been built according to the arrangement shown herein; and no furnace not built this way, has been successful; and further, the writer does not know of any furnace which has been built as described which has not been a success.

There are no doubt other ways of doing it, perhaps better; but so long as this way has accomplished the fact and is in accordance with



**FIG. 19**—Hypothetical lines of forsterite arch, after heating; skewbacks assumed to move outward sufficiently to compensate for thermal expansion of the arch chord. Hot face temperature of 2900 deg. F.

the requirements of the physical characteristics of the bricks, it would seem unwise to experiment with any other principles until after basic roofs are established in this country.

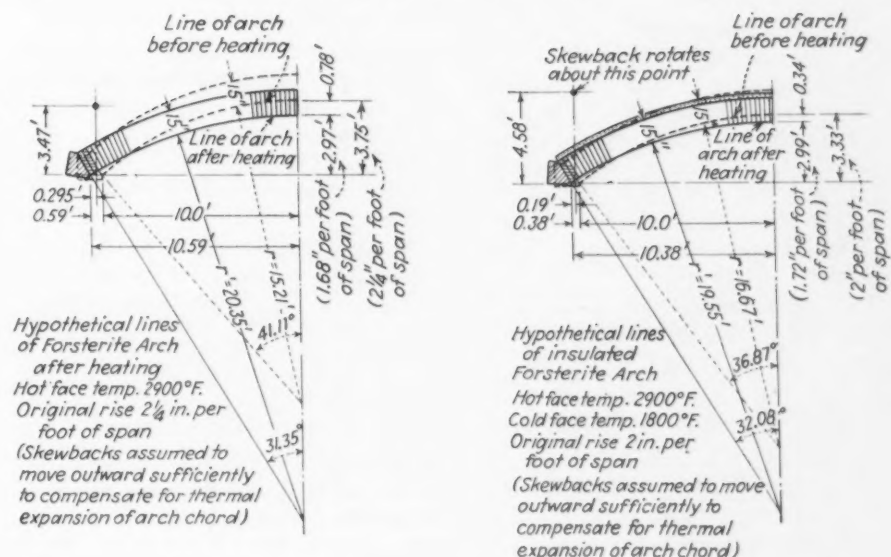
It should be added that this type

of roof was developed by the Austro-American Magnesite Co. It is not patented or controlled by anyone, and is not now patentable in this country.

Some of the features other than the roof have been patented.

o o o

**FIG. 20**—These drawings show the results of allowing the skewback to move outward and also to rotate.



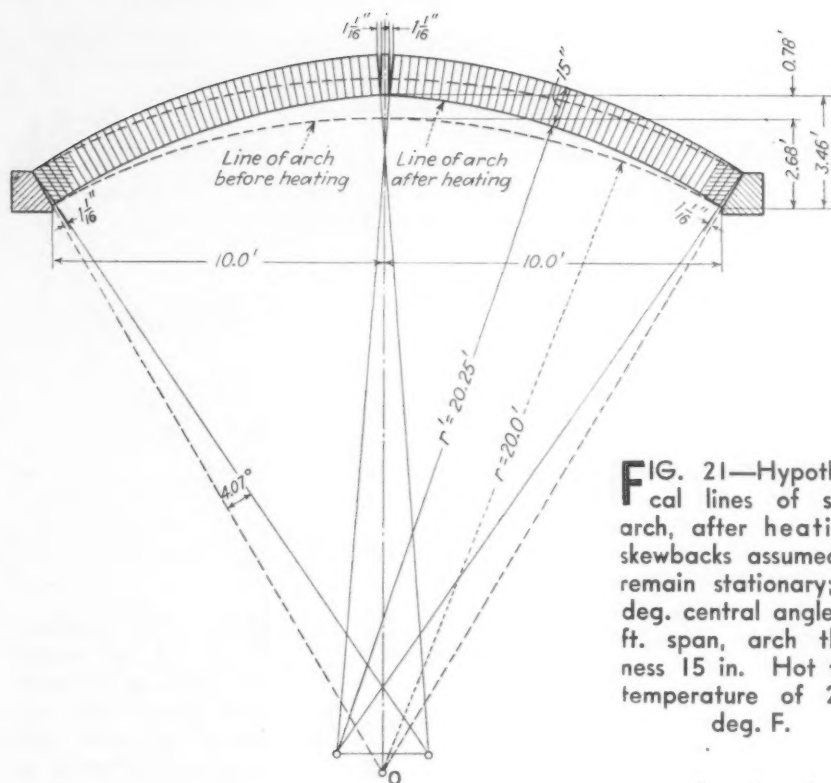


FIG. 21—Hypothetical lines of silica arch, after heating; skewbacks assumed to remain stationary; 60 deg. central angle, 20 ft. span, arch thickness 15 in. Hot face temperature of 2900 deg. F.

#### Economics

The economics of the basic construction depend pretty much upon the place. The writer has not seen or heard of any place where the ingot cost was not considerably reduced. The greatest cost saving comes from those items of "cost above" which are inversely proportional to tonnage, such as fuel, labor, overhead, etc. Brickwork and repair labor will show a substantial reduction over silica furnaces, even with the comparatively high cost of basic bricks. This item is aided by the reclamation value of the basic brick material. After the used bricks have been moved around to other parts of the furnace and are finally no longer useful for this, they still have a value equal to chrome ore as a patching material.

It is therefore necessary, in considering the cost, to spread it over several campaigns, as subsequent furnaces are far less expensive than the first. The cost for the additional structural work is non-recurrent.

Taking American conditions and prices as a whole, it seems perfectly safe to expect a saving of 50c. per ton of ingots, and a 25 per cent increase in production. The production increase would come from a higher rate per hour and a greater number of operating hours, almost equally divided.

As an example, assume a 150-ton furnace, where, with the silica roof, there is used about 1/2 basic bricks in the ends. The front and back walls will not be considered as in each case they would be basic, although the life would be much longer with the basic roof.

The following prices are paid for bricks:

Special Cr-Mg roof brick	\$76 per net ton
	\$450 per 1000 (9 in.)
Ordinary Cr-Mg	\$72 per net ton
	\$360 per 1000 (9 in.)
Silica brick	\$17.33 per net ton
	\$52 per 1000 (9 in.)
Checker brick	\$50 per 1000 (9 in.)

#### WEIGHTS

9 in., silica	6 lb.
Ordinary Cr-Mg	10 lb.
Special Cr-Mg	11.5 lb.

The chrome-magnesite roof will weigh 175 tons—special quality.

The ends will weigh 360 tons—ordinary Cr-Mg.

Silica furnace, same thickness of roof will weigh:

Roof	85 tons
Magnesite in ends	180 tons
Silica in ends	108 tons

In each case there will be 150,000 9 in. equivalent checker brick.

For ease in calculation it will be assumed that in a given time the chrome-magnesite furnace has lasted for three silica roofs; that 1200 man-hr. per day are used in repairing after a roof; the average price of labor in repairs (to be

conservative) is 80c. per hr.; the silica furnace requires 10 days and the basic furnace four days, for rebuilding.

It can be further assumed that the superstructure necessary with the basic roof costs \$3000 and is charged off approximately 20 per cent per year.

#### Silica Furnace

Roof:	
85 tons silica brick @ \$17.33	\$1,473.05
Ends:	
108 tons silica brick @ \$17.33	1,871.64
180 tons ordinary magnesite @ \$72	12,960.00
Checkers:	
50,000 each rebuild @ \$50	2,500.00
12,000 man-hr. @ 80c.	9,600.00
Total bricks and labor	\$28,404.69
Credit 40 per cent of bricks @ \$8 per ton	1,193.60
Net bricks and labor expense	\$27,211.09
Three rebuilds	\$81,633.27

#### Basic Furnace

Roof:	
175 tons special Cr-Mg @ \$76	\$13,300.00
Ends:	
360 tons ordinary Cr-Mg @ \$72	25,920.00
Checkers:	
15,000 each rebuild @ \$50	750.00
4,800 man-hr. @ 80c.	3,840.00
	\$43,810.00
Credit 40 per cent of brick @ \$30 per ton	6,420.00
	\$37,390.00
20 per cent of structural	600.00
Basic furnace cost	\$37,990.00

The production of the silica furnace over this period is 100 and the basic 125. The cost per ton rate is therefore:

Silica	81,600
	100
Basic	38,000
	125

Or, the cost for these basic bricks and rebuilding labor is over the period, approximately 18 months, 37.25 per cent—say 38 per cent of the cost of the silica furnace.

It would appear that with these assumptions the basic brick cost would split even with the silica cost at about 500 heats from the basic roof.

The greatest cost factor, however, is in the reduction of operating labor, fuel, running repairs, plant overhead, etc., and those unappraisable items of bottom repairs, slag volume, front and back walls, effect of higher available temperatures on steel quality and sulphur.

This assumes a continuous run of the basic furnace, with no stops



for slag pockets, checkers, or runners. There will, of course, be the usual minor troubles with door frames, valves, seats, etc., but in the design of a new furnace these can be reduced to a minimum.

#### Brick and Arch Characteristics

For the following study of the effects of brick characteristics in arches, the writer is indebted to Spotts McDowell, of Harbison-Walker Refractories Co.

Mr. McDowell's study has been far more comprehensive than the part shown here, but this particular phase of it is pertinent to the reason why the roof construction described herein works, when other methods have failed.

The graphs and diagrams concern silica compared to magnesite and forsterite. The properties of chrome-magnesite are intermediate between these other basic or neutral bricks. The principles involved for forsterite are, therefore, identical with those of chrome-magnesite, the difference being only one of degree. The linear expansion of the chrome-magnesite is slightly less than that of the forsterite.

Mr. McDowell made this study before he was aware of the manner in which basic roofs were constructed in Europe.

Fig. 15 shows the calculated temperature gradient through 15 in. roof bricks, where the hot face is 2900 deg. F. The second graph is the per cent of linear expansion of the brick at different distances from the hot face.

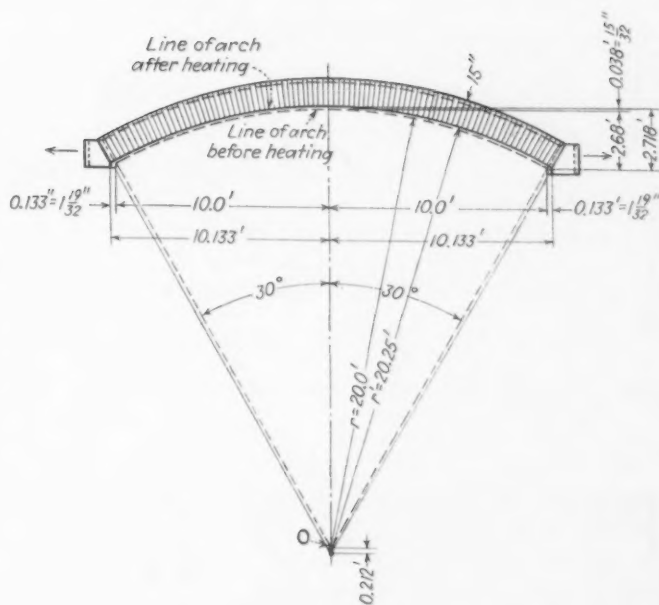
It is obvious from this graph that the bearing surfaces of adjoining bricks are altogether different for silica and basic bricks.

Fig. 16 shows this relationship between adjoining bricks on an exaggerated scale. The silica brick maintains a contact for about 2/3 of its length, while the basic brick touches only at the bottom, or hot face. The thrust of the silica arch is taken up by about 2/3 of the area of the brick, which increases the pressure at any point only about 1/3. With the basic brick the contact is infinitesimal and the pressure, therefore, infinity.

It would appear that, in the case of the basic roof with metal liners between each brick, slippage actually takes up about 2/3 of the expansion.

Fig. 17 shows the shape that a forsterite roof arch would take when heated, assuming one fixed

**FIG. 22—Hypothetical lines of silica arch, after heating; skewback assumed to move outward sufficiently to compensate for thermal expansion of the arch chord. Hot face temperature of 2900 deg. F.**



skewback, while Fig. 18 shows the lines of the forsterite arch, with back skewbacks fixed. The enlarged section shows the contacts only on the hot face of the bricks.

If the skewbacks were allowed to move outward only, in the case of the forsterite roof, the radius of the arch would increase about 50 per cent and the contact between the roof bricks and the skewback bricks would take place only at the lower edge, again bringing the pressure to infinity. See Fig. 19.

Fig. 20 shows the result of allowing the skewback to move outward and also to rotate, the rotation point being 3.47 ft. above the toe of the skewback brick. If the roof is insulated as on the second graph in Fig. 20, the condition is much improved and the center of rotation of the skewback is 4.58 ft. above the toe.

This is approximately the condition which is met by the basic roof construction described.

In the case of the silica roof with fixed skews, the expansion produces an effect shown in Fig. 21. The opening of the top of the bricks in the center is usually observed to be in several places, rather than directly in the center. In this case the contact at the top of the arch is on the bottom, and at the skewbacks, on the top. It is, therefore, only necessary, in the case of the silica arch, to allow the skewback to move outward, without rotation, to maintain an equalized bearing surface between all of the bricks. See Fig. 22.

There can be no doubt that slippage in the joints does much to compensate for expansion.

The movement on the springs of the basic roof is only about 2 in. on the bottom of the skew, while a solid arch of chrome-magnesite with no joints would have an expansion in 20 ft. of approximately 3.5 in.

From Fig. 20 it would seem that there must be some slippage in a vertical plane, and this would be promoted by the steel liners and the loose keying and the pressure of the holding down arrangement.

Since this roof construction meets the theoretical conditions imposed by the brick characteristics, which no silica arrangement can, it would confirm the soundness of the applied design.

The percentage of improvement in any place depends largely upon what is started with. In Australia, however, the writer feels safe in saying that the open hearth operation at Newcastle is as good as any in the world and that the comparison in production there between acid and basic is very real. Had that furnace not been handicapped by a section of the roof being silica, and by being compelled to shut down three times for cleaning the checker runners, and by having no basic bricks for repairs, the results would have been even more remarkable.

The results so far are somewhat startling, but it is fully believed that the near future will see the development of still more suitable basic refractories, better furnace design and operation, accompanied by further improvements in production and cost.

## Weight-Saving Vs. Cost In

# Tubular

By H. S. CARD

PARALLELING the advances that have been made in welded construction during the past decade, there has been a noticeable increase in the attention given to the utility of tubular sections in heavily loaded structures. It is doubtful whether there has ever been any question of the structural advantage of the round tube section, but its application and use were very much restricted previous to the development of the fusion welding processes, because of the difficulty of making satisfactory joints. In fact, the use of the tube section was largely confined to flow lines for liquids and gases, with occasional exceptions when it was used for structural purposes in spite of the economic disadvantage in order to obtain a much desired reduction in weight. Then, some 20 years ago, the application of fusion welding to various kinds of pipe line construction began to get serious attention. The development was rapid, and involved the working out of many ingenious designs and procedures for cutting, fitting and welding pipes of all sizes, largely eliminating the use of mechanical joints made with clumsy and costly fittings.

The simplicity of welded pipe joints eventually attracted the attention of engineers who were interested in the possibility of extending the use of the tube section in the structural field. Progress in this field has been relatively slow because of the difference in cost between steel pipe and the corresponding rectilinear sections commonly used in steel structures. On the theory that "a bird in the hand is worth two in the bush," it may be worth while at this time, however, to give more attention to the weight-saving possibilities and their possible effect on the conservation of steel. Certainly, a ton of steel

that can be conserved in 1941 and 1942 has greater utility in the immediate present than an additional ton of steel which may become available two or three years hence as a result of new steel mill construction. Furthermore, it may be possible to offset much if not all of the price difference in material by savings in fabrication, transportation, painting, maintenance, etc.

The designer who attempts to make an engineering analysis of a tubular structure in comparison with a structure made of rectilinear sections is at a disadvantage in one respect in that it is difficult to arrive at a thoroughly satisfactory basis for comparison, because so few of the standard commercial sizes of the various sections have equal characteristics. If rolled sections are to be used throughout, he must calculate his allowable loads on the basis of either welded construction or riveted construction

and in both these cases the designs of the joints will be different. If tubular members are used, it can be taken for granted that welded construction is indicated, and the designs of the joints may vary widely. Comparisons are best made on complete structures.

There is need also to consider the relative economical advantage in standard pipe sizes and welded pipe or tubing. Standard pipe is, of course, limited to a narrow range of wall thicknesses whereas welded pipe or tube can be obtained in any desired wall thickness and consequently offers a wider variety of choice of section characteristics. This is illustrated in Table I. In this table a standard size of welded steel tube—3¾ in. o.d. x 0.148 in. wall thickness—is compared with a 3-in. standard pipe and with a number of rolled sections having approximately the same section area. In this tabulation, the struc-

TABLE I  
Comparative Strength Factors for Tubing, Standard Pipe and Structural Shapes of Approximately Equal Cross-Sectional Area

Section	Area, Sq. In.	Weight, Lb. per Ft.	Moment of Inertia, In. <sup>4</sup>	Section Modulus, In. <sup>3</sup>	Radius of Gyration, In.
3¾ in. x 9 ga. round tube...	1.67	5.7	2.71	1.45	1.27
3 in. standard pipe.....	2.23	7.58	3.02	1.72	1.16
3 x 2⅝ in. I-beam.....	1.64	5.7	{ 2.50 0.46	1.70 0.40	1.23 0.53
3 x 1.8 in. channel.....	1.68	5.8	{ 2.40 0.53	1.60 0.47	1.20 0.56
3 x 1½ in. channel.....	1.75	6.0	{ 2.10 0.31	1.40 0.27	1.08 0.42
3½ x 3½ x ¼ in. angle.....	1.69	5.8	2.00	0.79	1.09 (least r = 0.69)
4 x 3 x ¼ in. angle.....	1.69	5.8	{ 2.80 1.40	1.00 0.60	1.28 0.89
3 x 2½ x 5/16 in. angle.....	1.62	5.6	{ 1.40 0.90	0.69 0.49	0.94 0.74 (least r = 0.65)
2½ x 2½ in. T.....	1.6	5.5	{ 0.88 0.44	0.50 0.35	0.74 0.52 (least r = 0.53)
3 x 2½ in. T.....	1.77	6.1	{ 0.94 0.75	0.52 0.50	0.73 0.65



# r Design

**T**HE comparatively high cost of the round tube section as compared with flat rolled sections is being offset by the incentive to save weight and increase rigidity in heavily loaded structures. A review of some recent applications points to further development of simplified joint designs and fabrication methods.

tural advantage of the round tube is immediately obvious, particularly when considering the lower values of structural sections.

Theoretically, it would, of course, be possible to obtain improved characteristics in some of the rectilinear sections by increasing outside dimensions and reducing thickness, but in practice it is necessary to maintain dimensions that will avoid the danger of buckling. Since there is no appreciable advantage in any of the standard sections for tension members, it is frequently practical to combine tubular sections with rolled shapes. This has been done in several cases with satisfactory results.

## Selection of Joints

The designer has considerable latitude in his choice of joints where the tubes are used by themselves or in combination with rectilinear sections. Fig. 1 shows schematically the general character of several different types of tubular joints. The most commonly used type requires cutting the tube ends to fit the profile of connecting members. Formerly, this was done by first developing templates for tracing or scribing the cutting lines on the pipe, a more or less tedious procedure. Today there are several types of oxy-acetylene pipe cutting machines on the market which do a smooth and accurate cutting job in a fraction of the time that was previously required.

Another type of joint involves the use of web plates inserted at the joint to stiffen it. Some designs of this nature are quite elaborate and consequently add considerably to the joint expense, especially if the design calls for slotting of the pipe. The use of several small stiffeners instead of one large plate will often prove equally satisfactory and less costly.

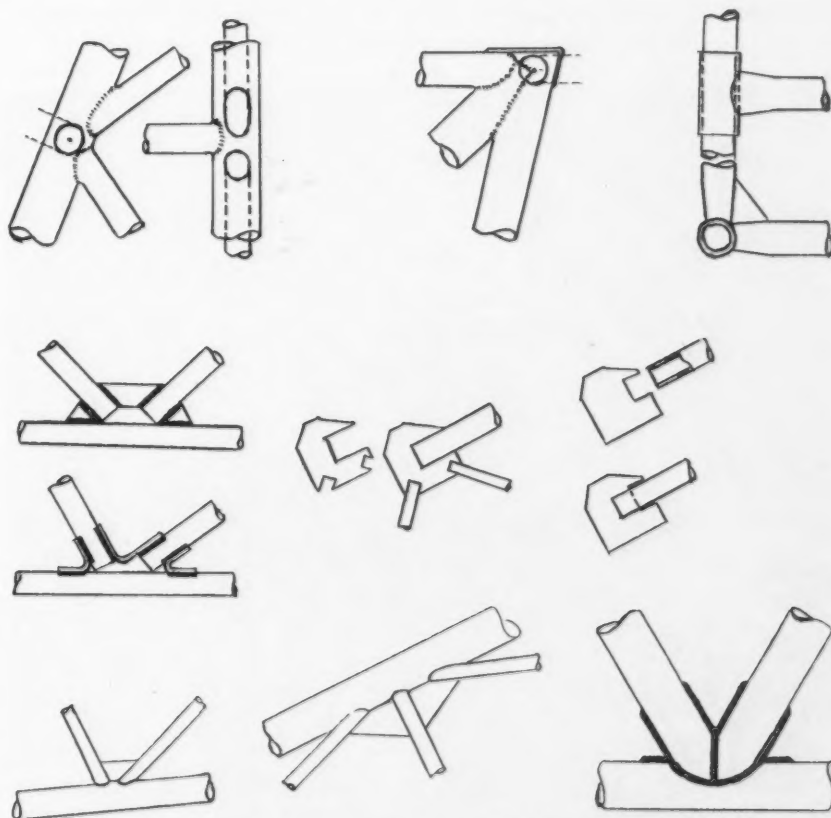
In all cases where stiffening plates are used it can be assumed that these would be cut out of plate with a machine operated oxy-acetylene cutting torch. Certainly no structural shop can be considered completely equipped these days that does not have one of these instruments.

The joining of tube to tube, or of tube to a rolled section, by the simple device of cutting the tube with a power shear has been practiced successfully when the tube sections were of small or medium diameter. Another practical method of joining tube to flat rolled sec-

tions is to flatten the end of the tube. If the wall of the tube is comparatively thin it can be reinforced by inserting a short length of smaller diameter tube inside for a sufficient distance to act as a reinforcement in the neighborhood of the joint. The designing engineer has to make his selection from the various possibilities on the basis of safety and economy.

## Typical Design Applications

Some idea of the variety of possible applications of the tubular section may be obtained from the accompanying illustrations. Fig. 2



**FIG. 1**—Typical joints or connections used in heavily loaded tubular structures. In several instances, the use of web plates as stiffeners is illustrated.

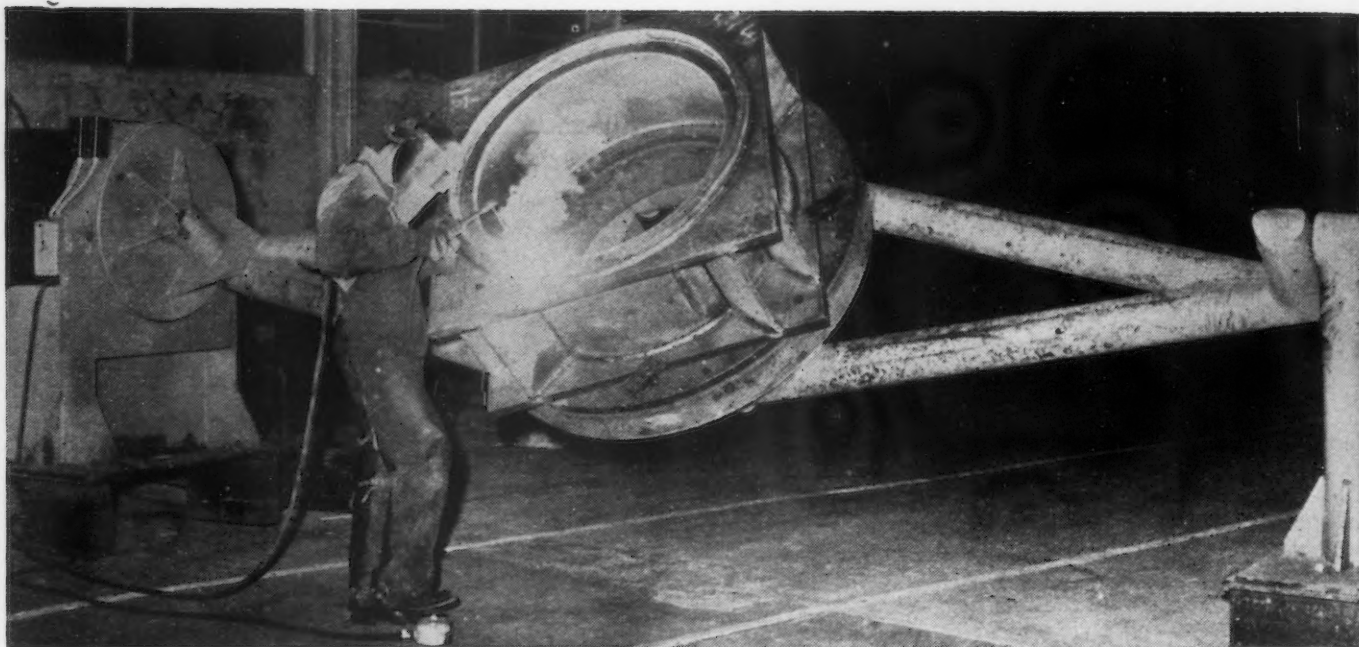


Fig. 2—Casing pipe of 6 $\frac{5}{8}$ -in. o.d. forms the chief structural members of this large size welding positioner.

is a work positioner, or manipulator. Its function is to hold heavy steel assemblies for welding and permit the work to be turned in all directions so that the welder is always able to deposit metal in what is called a "downhand" position.

This device is built in various sizes for rated loads up to 3 tons and up to 5 tons. The over-all size of the work pieces which it can handle can be increased by mounting it on beams or piers or by locating it over a pit. The principal

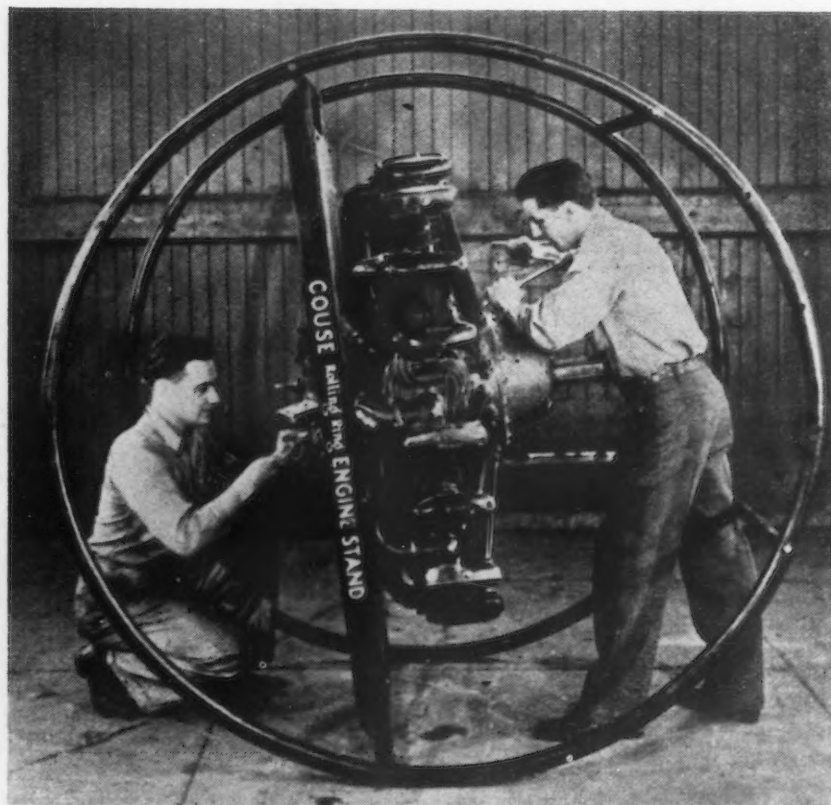
members are made of 6 $\frac{5}{8}$  in., 28-lb. casing pipe with a wall thickness of approximately 7/16 in.

An entirely different work handler is found in the ingenious engine repair stand shown in Fig. 3. This is made up of two tubular rings, four tubular cross-pieces and a metal platform. It is assembled by bolts so that it can be taken apart for transporting. It serves the purpose of a very easily portable stand for making repairs to aircraft engines for the field. When the engine is bolted in place, two mechanics can work on it simultaneously in any desired position. It is a good example of what can be developed in the way of useful designs by simply taking advantage of the natural characteristics of the tube sections and without attempting to duplicate conventional designs or structures.

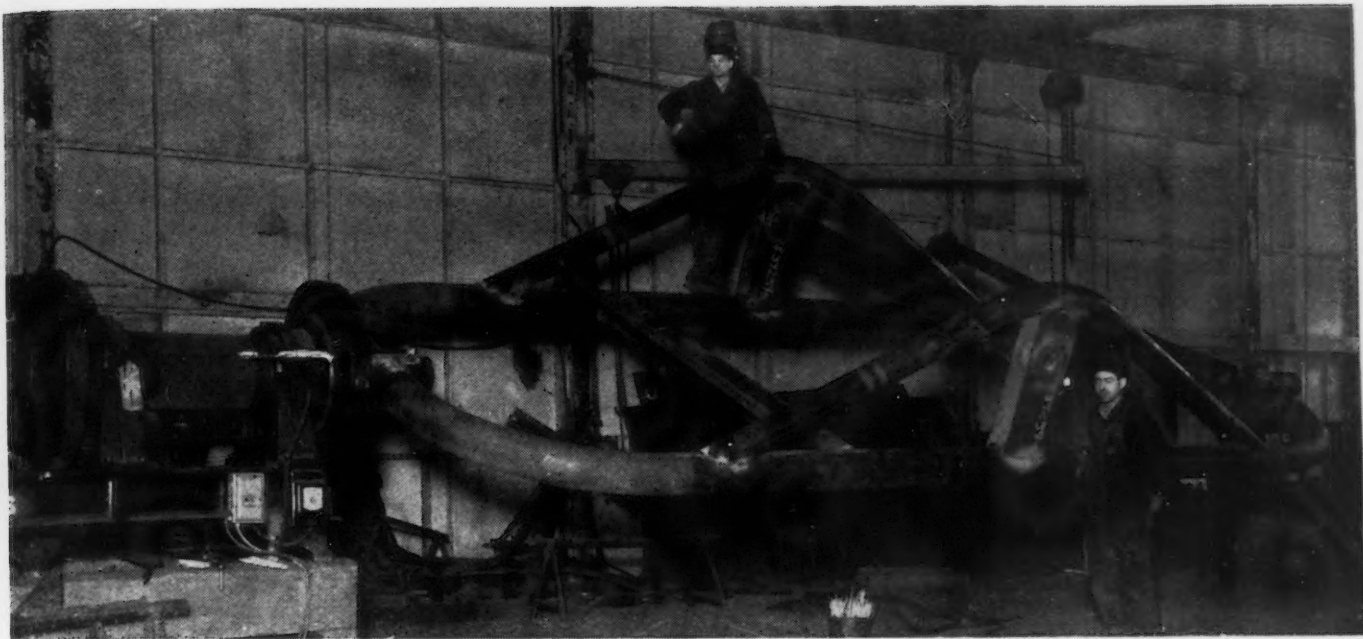
Another thoroughly unconventional structure is the frame of an earth moving machine, shown in Fig. 4. Some of the machinery involved in this device were operated by compressed air, and the designer took advantage of the tube section by making it act as an air reservoir. Later models of the machine utilized hydraulic power instead of compressed air, but the tubular frame was continued in use because the design proved to be so satisfactory both structurally and economically.

The Harnischfeger Corp., Milwaukee, has used tubular sections for many years in the construction

FIG. 3—This aircraft engine repair stand is a good example of what can be done in taking advantage of the inherent characteristics of the tube sections and avoiding conventional structural design.







of crane booms, one of which is illustrated in Fig. 5. Booms of this type are standard on several models of the truck cranes manufactured by this company. Some of the designs use the tube section throughout and others use tubing in combination with angles and channels. In both cases there is a considerable reduction of weight without sacrifice of load capacity. The advantage of the round tube section is not entirely a matter of reducing weight, although the conservation of power is always desirable in portable machinery. There is an added factor of high rigidity in the design which is considered very desirable in a crane boom. This construction, moreover, is by no means experimental. More than 500 of these truck cranes with booms of this design have been manufactured.

#### Advantages of Spherical Joints

A tubular structure of impressive size which recently made news is the towing carriage, Fig. 6, used in the new David W. Taylor model basin at Carderock, Md. The design of this carriage utilizes a spherical connecting member to simplify the joining of several tubes at a single intersection. One great advantage of this joint design is that it permits many of the members to be cut off square where they join the sphere. This reduces the amount of welding, makes inspection easier and avoids eccentricity in the joint because the center line of the tube passes through the center of the

ABOVE

**F**IG. 4 — Another application of heavy tubing is in the frame of a large earth-moving machine. The frame is shown being welded on a homemade positioner, using the headstock of an old lathe for rotating the work into the desired position.

o o o

RIGHT

**F**IG. 5 — More than 500 crane booms fabricated with welded tubing have been put into successful operation by the Harnischfeger Corp.





**FIG. 6**—This towing carriage installed at the David W. Taylor model basin is thought to be the largest existing structure employing tubular members with spherical joints.

sphere. The towing carriage is about 70 ft. in length and the truss panels are 9 ft. high. Since the apparatus is planned to operate with the accuracy of a precision instrument, the design required that all parts have the greatest practicable strength and rigidity with the least weight.

A second carriage, similar in design to the one illustrated, and a third carriage, smaller in design, are to be constructed and it has already been decided to use this spherical joint more extensively be-

cause it has been observed that a slight "unfairness" exists at a few points on the frame of the first carriage at joints where hollow spheres were not used.

The spherical type of joint was discussed in considerable detail in a prize-winning paper entitled "Using Tubes as Structural Members" by Messrs. Burstall, Kennedy and Smith in the second Lincoln Prize Contest about 10 years ago. This paper explained the advantages of tubular structures and pointed out the utility of the spherical connect-

ing member as a means of improving the structural value of the joint while greatly simplifying the problem of obtaining uniformly satisfactory connections between tubular members. As evidence of the practicability of the design, the authors described the construction of a welded gantry, and compared it with a construction of the same dimensions, (1) of conventional riveted design, (2) of conventional welded design using flat rolled structural shapes.

Table II is a comparison of the cost summaries of the various types. In case 4 of this table it is proposed to stress both tension and compression members to 31,400 lb. per sq. in., giving a factor of safety of only 1.15 on the yield stress of 36,200 lb. The justification offered for this is that when conventional formulas are used for light structural work, maximum stresses closely approximating the yield stress are allowed by standard specifications. Consequently it is contended that a direct stress of 31,400 lb. per sq. in. for perfectly concentric loading is permissible for the tube and sphere type of design. The authors recommended the production of spheres by resistance welding two formed half-spheres together.

The spheres used in the construction of the towing carriage, however, were of cast steel  $\frac{3}{8}$  in. thick partially stiffened by a circumferen-

**TABLE II**  
Comparison of Weights, Painted Area and Costs of Structural Steel and Tubular Frame Gantry and Supporting Columns

	Maximum Permissible Working Stress, Lb. per Sq. In.	Total Weight of Structure, Lb.	Sav- ing in Weight Over Riveted Design, Per Cent	Painted Surface Area, Sq. Ft.	Cost in Dollars				Sav- ing in Cost Over Riveted Design, Per Cent
					Material	Labor	Over- head 100 Per Cent of To- tal		
Conventional riveted design	18,000	8007		1286	156.3	148.6	148.6	453.5	
Conventional welded design using angles, etc.	18,000	7360	8.1	1245	152.2	135.0	135.0	422.2	6.9
New type construction with tubes and spheres	18,000	4296	46.3	630	192.3	87.7	87.7	367.7	18.9
New type construction with tubes and spheres	31,400	3247	59.4	615	141.6	84.6	84.6	310.8	31.4

Length of gantry is 126 ft., divided into four spans of 31 ft. 6 in. each.  
Design load, 336 lb. per running ft.



tial diaphragm of the same thickness. It is thought that the towing carriage is the largest existing structure employing spherical joint design. Theoretically its advantages could be applied to all sizes of tubular structures down to those involving thin walled aircraft tubing.

If the future development of tubular structures is to follow the pattern of other notable applications of fusion welding, the apparent high cost of the round tube section as compared to flat rolled sections will at first seem to be a serious disadvantage. However, it is probable that the incentive to save weight and to increase rigidity will encourage further study of simplified joint designs and fabrication methods. The selection of a few standard tube sizes that can be produced most economically in large quantities would certainly result in a considerably lowered cost. It is not unreasonable to expect that these factors may combine to allow an entirely favorable overall cost of a completed structure. It has already been determined in the case of some of the applications described above that the tubular section has enough inherent advantage to warrant its use in future production.

#### Military Applications Suggested

It is worth noting that the special virtue of weight saving in military articles is that it can be counted upon to increase striking power. It is true enough that weight in the right place will increase the striking power of an attacking force, but whenever weight is added where it is not required, the only effect it

has is to reduce speed and consequently to reduce impact, all the while adding to the burden imposed upon transport power. Lightness therefore contributes to the speed of movement and to an increase in the amount of military strength which can be transported with the same power. Some of the possible applications which might be devel-

oped to utilize this principle are: sections of portable foot bridges; racks for delivering bombs to planes, or ammunition to field pieces; ladders, platforms and stands; frames for metal pontoon boats; square and rectangular tube body frames for ammunition and supply trucks and other mechanical equipment.

## 4½-Ft. Plastic Fan Blades

**T**HE longest mold ever made by the plastics department of General Electric Co., West Lynn, Mass., is being used to produce fan blades, formerly made of metals. The blades, 4½ ft. long, are made for the Foster Wheeler Corp., for tower fans to cool large quantities of water needed for power plants, in condensing oil refineries, for air conditioning, and similar applications.

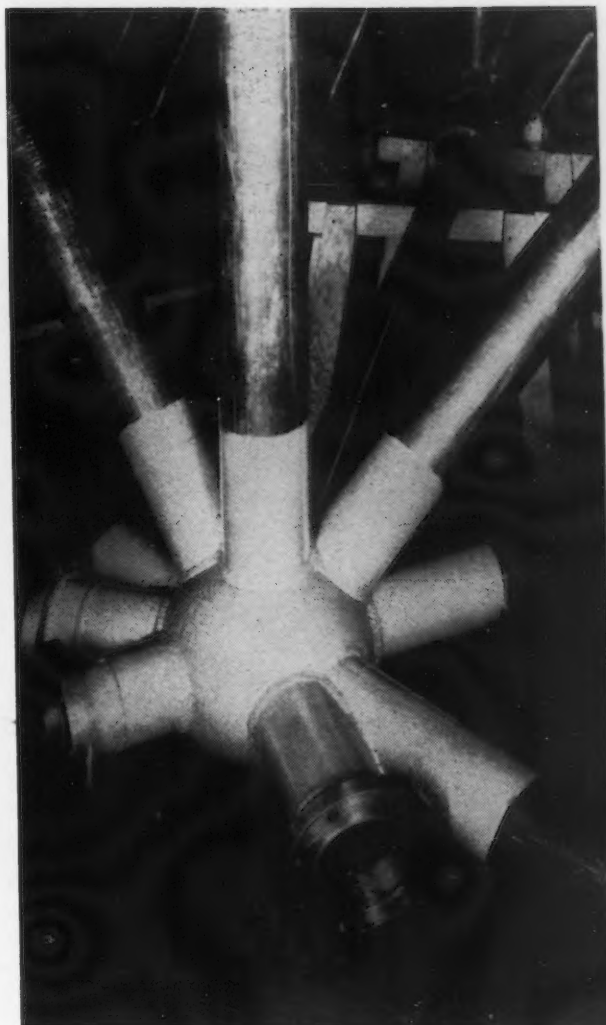
A molded plastic fan blade is particularly important at this time because of the need for defense of metals formerly used, such as aluminum and magnesium. Furthermore, the new plastic blade is lighter than metals formerly used, but is of equal strength.

Corrosion was the chief difficulty in the use of metal blades, a problem particularly acute when they

were subjected to salt water. Metal blades were painted and baked to eliminate this problem, but the plastic fan does not need this added protection.

The plastic fan blades are made of a molded-laminated Textolite and weigh approximately 25 lb. Four blades are assembled on a molycast iron hub, making a fan about 12 ft. in diameter.

**FIG. 7—Close-up view of a 10-tube joint with a 10-in. diameter cast steel sphere. This was a full size test section of the tubular frame for the towing carriage shown in Fig. 6.**



# Carburized Armor Plate F



**A**RMOR plate for aircraft is a "must" these days to protect pilots and gunner crews from ground fire and strafing by enemy pursuit ships. The only question not yet settled is what type is best—homogeneous plate or face hardened (carburized) plate.

As its name implies, homogeneous plate has a uniform and consistently hard and compact structure from front to rear. If made too hard, it has the tendency to throw buttons, spall and shatter when subjected to bursts of machine gun fire, due to the internal vibration set up in the molecules of the plate. However, in aircraft applications the high speed of the plane precludes concentration of fire in a small area (dispersion of hits is such that no two shots occur less than 8 in. apart). Some believe homogeneous plate is more

**F**IRST step in the process of making case carburized armor plate for aircraft is to cut the plate to shape. At the Breeze Corps. plant, Elizabeth, N. J., this operation is being performed with an automatic Linde Air Products pantograph cutting torch, guided by formed template strips. This is untreated alloy steel plate as it comes from the steel mill.

o o o

**A**FTER the plate has been cut to shape and formed to the desired curvature, one side is given a protective coating to prevent carburization in the Ajax salt bath shown. Heat is created by passing current through the bath. Compared with pack hardening, carburizing is done in about one-third the time in this liquid bath since the long time to heat up the pots and the slow cool before the work can be removed from the compound is eliminated. Work of intricate curvature presents no problem as the work is simply lowered into the bath. Besides, special carburizing salts are used which have very close to a straight time-carbon absorption curve. With many commercial carburizing salts, the carbon absorption rate diminishes rapidly after the first few hours in the bath. A high concentration of carbon in the bath is responsible for this improved performance. Bath temperature is around 1750 deg. F., common for all types of carburizing work.





# te For Aircraft

suitable for aircraft than face-hardened plate since it can readily be formed to contours, has a simpler heat treatment and in general is easier to fabricate (can be machined after heat treatment, for example).

On the other hand, hand carburized or face-hardened armor plate, as the name implies, has an extremely hard face surface for about 25 per cent of the thickness, with a much softer and ductile back surface. Such finished plates can not be drilled or machined, and when hit by an armor-piercing machine gun bullet of the proportionate size to the thickness of the plate, the bullet shatters, not the plate, and the point of the bullet appears to fuse to the plate, forming a small barnacle-like crater.

The old munitions salesman's slogan that he could supply armor plate that no shell could pierce, likewise a shell that could pierce any armor plate, is true today and necessitates the continual improvement in ballistic properties of both armor plate and armor-piercing ammunition.

Breeze Corps., with five plants in Newark, N. J., and vicinity, has overcome the chief objections of carburized plate by developing a process of liquid carburizing and press quenching, thereby reducing warpage to a large extent and increasing the ballistic limit about 50 per cent over homogeneous plate of the same thickness. (The specific bullet velocity at which a plate just resists penetration is termed the ballistic limit of the plate.)

The accompanying pictures show the principal operations on armor plate as carried out at the Breeze plant. It supplies many of the leading military aircraft builders. The company has been in production on this plate for about a year but the experimental work goes back much further. The two men primarily concerned in the initial development of the liquid carburizing method used are A. Langstaff Johnston, Jr., vice-president in charge of research and development,

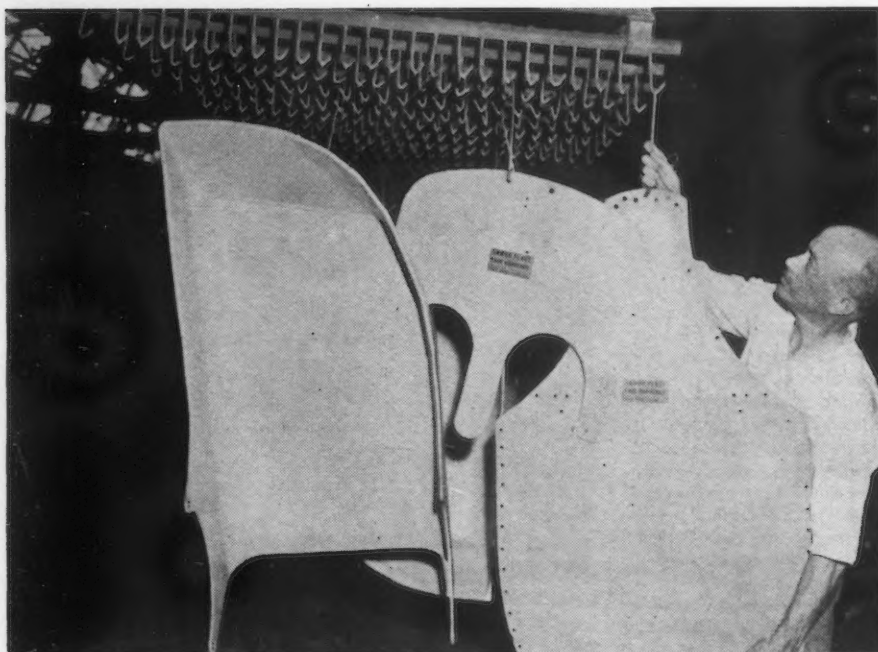
**W**ELDING a steel armored seat for an airplane pilot at the Breeze plant. It is possible to weld carburized armor plate without destroying the ballistic properties of the plate in the vicinity of the weld by employing stainless steel rods and following a precise procedure. The deposited weld metal itself resembles in ballistic properties homogeneous steel plate in that it is tougher and more ductile than carburized plate at the surface. Tests made at the Breeze plant indicate that a machine gun bullet core will partly penetrate the weld metal, whereas against the carburized surface, the bullets will shatter.



o o o

**O**NE of the chief difficulties of making case carburized plate is warpage due to difference in grain structure and heating, especially in pack hardening, where plates are mounted back to back. Warpage cannot be entirely eliminated, but is held to a low amount of camber in this specially devised oil quenching press. The hot plate is pulled out of the carburizing salt bath and immediately transferred to this quench tank. After the plate has been fully submerged edgewise, a hydraulic ram, not visible in this photograph, carries a platen against the plate and pins it against a cross frame of the quench tank, in which position the plate finally cools. The process of liquid carburizing is said to produce a much more ductile plate than is possible with pack hardening, thus further minimizing the danger of cracking during the straightening operations which follow quenching. The amount of straightening required has been greatly reduced, however.





LEFT

THREE types of aircraft armor plate face hardened by the Breeze process are shown hanging from a paint spray conveyor line. Left: Armor hood for bomber pilot, protecting head, back and sides from fire from the rear quarter, sides and above; center: breastplate with openings for legs of rear machine gunner; and, right: armor back of pursuit pilot.

RIGHT

PROOF testing Breeze armor plate on the company's own private range. A tracer bullet is shown being fired from a 0.50-cal. machine gun. Facilities are also available for firing 37-mm. armor piercing shells at heavier plate, or 0.30-cal. machine guns. Ballistically, the plate is said to rate 50 per cent higher penetration velocity than homogeneous armor plate of the same thickness.



and Rostislaw S. Komarnitsky, supervising engineer of the armor plate division. Of Ukrainian birth, Mr. Komarnitsky was once a fellow

student in Berlin of Willie Messerschmitt, builder of Germany's best-known fighter ships. The Breeze company's regular line consists of

radio shielding for aircraft ignition systems, cartridge type aircraft engine starters, flow meters, gas analyzers, etc.

## Improving Ingot Mold Life

A REPORT on the factors affecting the life of square section ingot molds for ingots over 2.5 tons, prepared from questionnaires sent to a number of German steel works and special investigations by the Open Hearth Process and Basic Bessemer Process Sub-committees of the Verein Deutscher Eisenhüttenleute, the German Steel Institute, was presented in the May 9 and May 16 issues of *Stahl und Eisen*.

The three principal factors

studied were the material of which the ingot molds were made, the shape and dimensions of the mold and the casting conditions. A high manganese content was found to be detrimental to mold life, while a high silicon-manganese ratio was decided to be favorable. A graphitic carbon content of 2.8 to 3.2 per cent gave the best life for small molds of the top pouring type. The ratio of the combined to the total carbon content should be as low as possible.

The ingot shape most conducive to long mold life was found to be

one with a high degree of taper and with a height to mean-thickness ratio as high as possible. The ratio of the mold weight to the ingot weight should be either 1:1 or greater than 1:1.3.

Where the basic bessemer process was used, slightly increased teeming rates slightly lengthened the mold life, whether top or bottom poured. Best results were obtained when ingots were stripped as soon as possible after pouring, or after 1½ hr. standing time. Immersing the molds in water or cooling by hosing were found considerably more detrimental than cooling in air.



# Silver to Replace Nickel and Chrome Plate

By ADOLPH BREGMAN  
Consulting Engineer, New York

WHEN the French peasants rioted for lack of bread, Marie Antoinette's flippant suggestion that they eat cake touched off many changes. Now, when the manufacturer of non-defense metal articles cannot finish them with the customary nickel and chromium plate, he will have to use some other finish, possibly a better one. It is, therefore, being seriously suggested that a good proportion of our metal novelties and containers be silver plated.

Silver has been grouped with the precious metals for so many generations that its mention in this connection may be a surprise to many. However, its price during recent years has been much lower than ever before. Today, silver sells for 35c. per troy oz. or about \$5.10 per avoirdupois lb., and the country has enormous stocks on hand. Since the metal is largely a by-product of the refining of the other heavy metals—gold, copper, nickel and lead—the supply is expected to hold up and undoubtedly will increase as the production of these other metals increases. The government and the nation as a whole have long been concerned about this oversupply of silver and the National Bureau of Standards has cooperated with silver producers in researches\* on ways of utilizing it.

\*"Silver in Industry," edited by Lawrence Addicks, Reinhold Publishing Corp., New York, 1940.

†"Twenty-fifth Annual Review of the Silver Market," 1940.

**Here is a possible way out for manufacturers pinched by the shortage of metals. The author discusses comparative costs, salability, usefulness, design and manufacture of silver plated articles, to replace articles previously plated with nickel and chromium.**

The low price and increased availability of silver have already occasioned considerable increase in consumption. Handy & Harman† report that the year 1940 set a new record for the use of silver by the arts and industries in the United States and Canada. They estimate the amount at 41,000,000 oz., an increase of more than 20 per cent over the preceding year and nearly 11 per cent over 1929. In the purely industrial fields, as distinct from the arts, there was continued expansion in plating for non-silverware purposes, in the manufacture of bearings, electrical contacts, alloys for soldering and brazing and in the construction of chemical equipment. Also there has been considerable use of silver alloys of various compositions in shipbuilding, and in the production of airplanes, guns, and other items of national defense.

Silver has several highly practical virtues in addition to its patrician beauty, some of which have only recently been recognized. Its

high reflective power, of course, has been known and utilized in mirrors for centuries. Its resistance to wear is proved by the way in which a plate on tableware, used daily and exposed to food acids, rough cleansing compounds, contact with other metal articles, etc., will stand up for years. The ability of a thin coating to prevent the corrosion of a steel basis metal has recently been demonstrated, and its remarkable germicidal powers, even when present in small quantities, are still under investigation.

In the Silver Producers' researches on silver coatings, one of their specific aims was "to determine the thickness of silver coating required which will simultaneously protect the backing of a vessel against corrosion, secure its contents against contamination, give adequate life (resistance to corrosion plus erosion) and compete successfully in price with rival materials, such as tin, nickel, aluminum, stainless steel, special iron alloys, lacquers, glass, ceramic wares and

rubber." Problems of fabrication, manufacture and design were attacked, and methods of heat treating studied.

With silver at 35c. per troy oz. (about 38c. in anode form) there are two groups of industrialists who should find interesting possibilities in silver plating: (1) manufacturers of metal articles that are currently being nickel and chromium plated, and (2) electroplaters who have not yet installed full scale silver plating equipment in their shops. The question will therefore

be discussed from the standpoint of these two groups.

#### Manufacturer of Metal Articles

Now that the shortage of metals for nickel, chromium and cadmium plating has forced the manufacturer of metal articles to give thought to silver plating, several questions will confront him. How much will it add to the cost? How will it influence salability? How will it affect the usefulness of the article? Will it turn out to be a permanent improvement over old finishes or merely a substitute to be used only

for the duration? Will it entail any changes in methods of fabrication of the basic article?

It should be said at once that the cost of good silver plating is but a little more than the cost of good nickel and chromium plating. The Silver Producers' researches demonstrated the possibility of manufacturing silverlined containers such as barrels, drums and cans, at a cost that would bear comparison with other linings.

The cost of any electroplated finish consists largely of the labor expended in cleaning, polishing, plating and buffing. This is much the same whether the final deposit is silver or nickel. Also, the cost of electrical energy required differs only slightly in terms of cents per lb. of metal deposited, from metal to metal.

As a matter of fact it takes less current to deposit an equivalent weight of silver than of nickel, copper or chromium. The actual cost of deposited metal, which may be only 0.0001 in. to 0.0002 in. thick, may represent a very small percentage of the total cost of the manufactured product, 1 per cent to 3 per cent in the case of base metals. When these facts are considered it will be seen that the substitution of silver for nickel and chromium, for example, will have a comparatively small effect upon the total cost. In some instances this extra cost may be absorbed, while in other cases it can be passed along to the ultimate consumer without difficulty. In some cases it might lead to improved usefulness, commanding commensurately higher prices.

Detailed analyses of the cost of each step in chromium plating have been made and a study of these steps will show how large a part of the total goes to labor in the preliminary treatments. Costs vary with the thickness of the deposit and the treatment necessary for the base metal; also the number and thickness of the undercoats, if any. It will be noted that for a deposit of 0.0002 in., the cost of metal would be about 0.5c. per sq. ft. if nickel is used, and about 5.5c. per sq. ft. for silver.\*

#### Cost of Silver Plating

Let us take for example a chandelier holder of cold rolled steel measuring some 8 in. across and

\*"Priorities and the Plater," by Adolph Bregman, *THE IRON AGE*, May 15, 1941, p. 42.



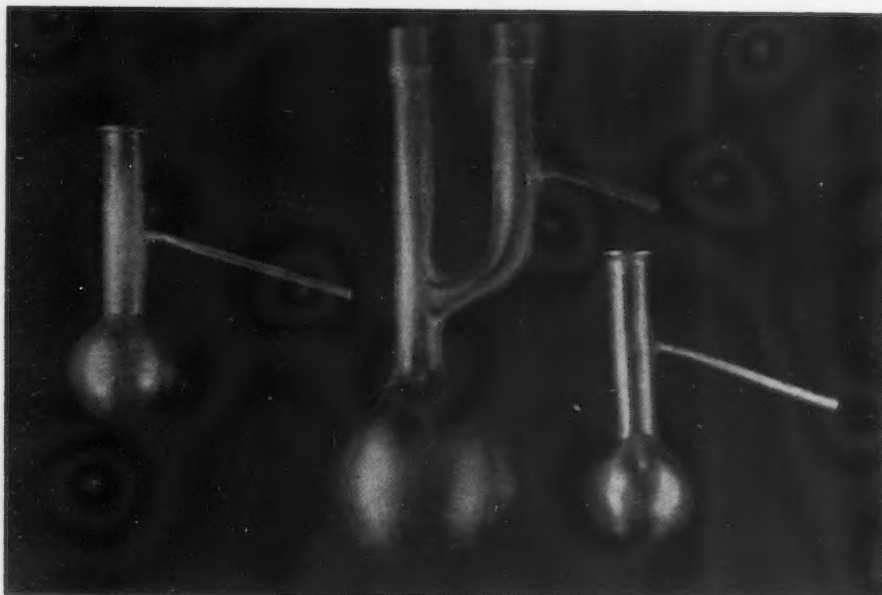
LEFT

**FIG. 2**—This is a cross-section of the electroformed flask, showing the fusible metal base and the silver shell. Photo courtesy American Silver Producers' Research Project.

o o o

BELOW

**FIG. 1**—These electroformed silver flasks were made by plating silver on a fusible metal base and then melting out the base, leaving a silver shell. Photo courtesy American Silver Producers' Research Project.





4 in. deep. The cost of chromium plating this article was discussed in these columns.\* The operations

\*"Setting a Price for Plating", by Adolph Bregman, *THE IRON AGE*, Nov. 7, 1940.

involved, with copper and nickel undercoats, are:

- |                                |  |
|--------------------------------|--|
| (1) Grind with No. 120 emery.  | (14) Clean in alkaline cleaner.              |
| (2) Polish with emery flour.   | (15) Rinse.                                  |
| (3) Polish with tampico brush. | (16) Pickle.                                 |
| (4) Rack for copper plating.   | (17) Rinse.                                  |
| (5) Degrease.                  | (18) Nickel plate in bright nickel solution. |
| (6) Clean in alkaline cleaner. | (19) Rinse.                                  |
| (7) Rinse.                     | (20) Unrack.                                 |
| (8) Copper plate.              | (21) Rack for chromium plating.              |
| (9) Rinse.                     | (22) Chromium plate.                         |
| (10) Dry in sawdust.           | (23) Rinse.                                  |
| (11) Unrack.                   | (24) Dry in sawdust.                         |
| (12) Buff the copper plate.    | (25) Buff chromium plate.                    |
| (13) Rack for nickel           |  |

The time record for 100 pieces, showing the direct labor costs, with nickel and copper undercoats, is shown in Table I.

If these pieces were to be plated in silver instead of copper, nickel and chromium, the operations would be changed as follows:

**Operation 8—Copper Plate:** A much heavier copper plate would be used, say 0.001 in. instead of 0.0004 in. as in the case of nickel and chromium plating. The copper need not be buffed, and can be plated bright or left dull and the buffing done on the silver overcoat.

**Operation 18—Silver Plate:** A silver plating, 0.0001 in. thick, will be substituted for bright nickel plate, which is about 0.0004 in. thick, and the chromium plate will be omitted.

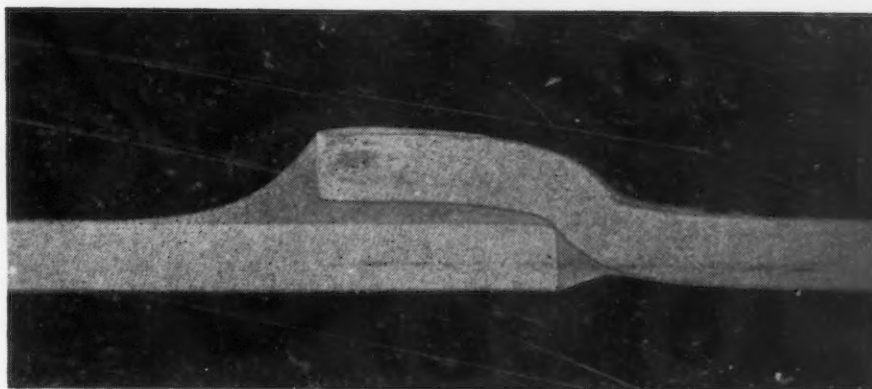
After unracking, the silver must be buffed carefully to avoid cutting through the thin coat, then clear lacquered and air dried or baked.

The revised schedule of operations will therefore be as follows:

- |                                   |                               |
|-----------------------------------|-------------------------------|
| (1) Grinding with No. 120 emery.  | (8) Copper plate.             |
| (2) Polishing with emery flour.   | (9) Rinse.                    |
| (3) Polishing with tampico brush. | (10) Silver strike and plate. |
| (4) Rack for copper plating.      | (11) Rinse.                   |
| (5) Degrease.                     | (12) Unrack.                  |
| (6) Clean in alkaline cleaner.    | (13) Dry in sawdust.          |
| (7) Rinse.                        | (14) Buff silver plate.       |
|                                   | (15) Clear lacquer.           |
|                                   | (16) Air dry or bake.         |

The time record for the revised plating schedule, using silver instead of nickel and chromium, may be estimated as shown in Table II.

In this instance, therefore, the direct labor cost of plating with

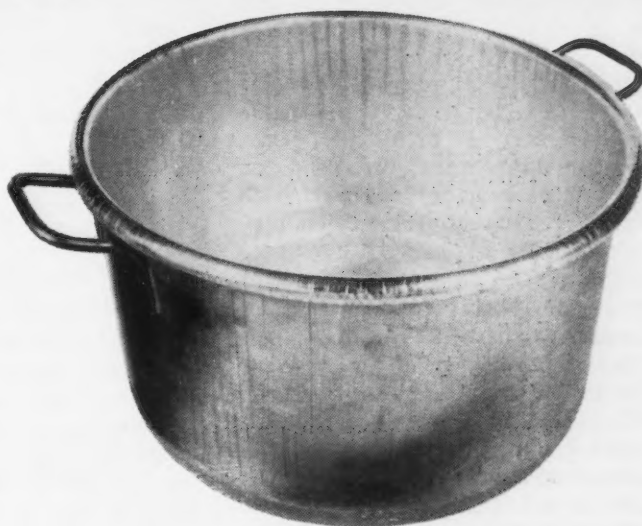


ABOVE

FIG. 3—Shown here is the clean offset lap joint of silver-plated steel, made with "Easy-Flo" alloy. Photo courtesy American Silver Producers' Research Project.

RIGHT

FIG. 4—This silver-lined container was prepared from a sheet of silver-plated, deep drawing steel, with an 0.005 in. silver plate over a copper plating of 0.001 in. thick. Photo courtesy American Silver Producers' Research Project.



silver and lacquering would be a trifle less than plating with copper, nickel and chromium.

For the total cost of the job, materials, power and other items of overhead must be added, as calculated from the proportion:

$$\frac{9}{4} \times \text{Direct Labor}^*$$

so the total costs of the differently

\*Derived from the formula, *Selling Price = 2.5 x Direct Labor*, as described in the article, "Metal Finishing Costs," *THE IRON AGE*, March 28, 1940. Note especially, Table II, p. 30.

plated holders may be estimated as:

Copper-nickel-chromium	11.52
Silver	11.40

To the overall cost of the silver plate, however, must be added the additional cost of the metal, that is (1) the difference between silver and nickel, and (2) the cost of the

added copper. These may be calculated as follows:

The outside area of the part is about 100 sq. in. The cost of nickel for this area at 0.0004 in. thickness is about 0.6c. The cost of silver at 0.0001 in. is about 2.1c., or an additional 1.5c.

Both silver and nickel will be deposited on the inside surface of the piece (where it is not needed) unless it is stopped off. The amount of metal so deposited may be estimated at one-half the metal on the outside surface. The cost of stopping off the inside and removing the stop-off would be much higher than the metal cost, making it advisable to let the metal go, as the lesser waste. The excess cost of silver over nickel so lost would be about 0.75c. The total additional cost of silver over nickel is therefore 1.5c. plus 0.75c. or about 2.25c.

**THIRTY-NINTH** in a Series of Articles on the Technical and Economic Aspects of Metal Cleaning and Finishing

The added copper due to the heavier coat may be estimated as follows:

Area of piece = 100 sq. in.  
 Inside area plated = 50 sq. in.  
 Total area covered with copper = 150 sq. in.

Added thickness of copper = 0.001 in. less 0.0004 in. = 0.0006 in.

Total volume of extra copper deposited =  $150 \times 0.0006$  cu. in. = 0.09 cu. in. per piece. Total weight of extra copper deposited = 0.09 cu. in.  $\times$  0.32 lb. = about 0.03 lb. per piece.

Total value of extra copper deposited =  $0.03 \times 25c.$  (per lb. in anode form) = 0.75c. per piece. To this figure must be added the cost of the lacquer (not used with nickel and chromium), which may be estimated at 0.35c. A recapitulation of the total cost of silver plating is therefore as follows:

General cost (including direct labor, overhead and ordinary supplies)	11.40c.
Extra cost of silver over nickel	2.25c.
Extra cost of copper (0.001 in. over 0.0004 in.)	0.75c.
Cost of lacquer	0.35c.

Total cost 14.75c.

The additional cost of silver plating over copper-nickel-chromium is therefore 14.75c. — 11.50c. = 3.25c. or about 28 per cent.

TABLE I  
Direct Labor Costs for Chromium Plating

(1) Emery @ 95c. per hr. (53 min.)	83c.
(2) Flour @ 95c. per hr. (53 min.)	88c.
(3) Tampico @ 90c. per hr. (60 min.)	90c.
(4-11) Copper plating:	
Plater @ 80c. per hr. (30 min.)	40c.
Helper @ 40c. per hr. (30 min.)	20c.
(12) Copper buff @ 95c. per hr. (45 min.)	72c.
(13-19) Nickel plating (bright):	
Plater @ 85c. per hr. (15 min.)	21c.
Helper @ 50c. per hr. (20 min.)	17c.
(20-24) Chromium plating:	
Plater @ 67½c. per hr. (20 min.)	23c.
Helper @ 42½c. per hr. (25 min.)	18c.
(25) Chrome buff @ 85c. per hr. (25 min.)	35c.

Total Direct labor (100 pieces) \$5.12

It must be borne in mind that the above instance is not typical of all silver plating cases, as no one example could be. In some cases no coat of lacquer would be required, as in can interiors. In others, a heavier deposit of silver would be required. The instance described simply represents one method of attacking the problem.

Moreover, when calculating costs, the value of the scrap metal and waste solutions must not be ignored. There is a definite value in

TABLE II  
Estimated Direct Labor Costs for Silver Plating with Copper Undercoat

(1) No. 120 Emery @ 95c. per hr. (53 min.)	88c.
(2) Emery flour at 95c. per hr. (53 min.)	88c.
(3) Tampico @ 90c. per hr. (60 min.)	90c.
*(4-9) Copper plating (estimated):	
Plater @ 80c. per hr. (30 min.)	40c.
Helper @ 40c. per hr. (30 min.)	20c.
(10-13) Silver plating (estimated):	
Plater @ 85c. per hr. (15 min.)	21c.
Helper @ 50c. per hr. (20 min.)	17c.
(14) Silver buff @ 95c. per hr. (45 min. estimated)	72c.
(15-16) Lacquering (estimated):	
Sprayer @ 70c. per hr. (1 hr.)	70c.
Total direct labor cost (per 100 pieces)	\$5.06

\*The cost of these operations should be somewhat less than the cost of operations 4 to 11 in Table I because operations 10 and 11 (sawdust drying and unranking) are omitted. The cost here, however, is kept at the same level because of the longer dwell in the tank to put on a heavier coat.

silver plated scrap and foul silver solutions; not great perhaps, but sufficient to justify their collection and sale to a refiner when good quantities are available.

*Editor's Note:—Next week the author will conclude this article on silver plating, discussing the salability, utility, design, and manufacture of silver plated articles.*

## Forging Ingot Defects Reduced

THE causes of defects in large ingots of basic open hearth steel for forging are discussed by E. Wulffert in the Sept. 19 issue of *Stahl und Eisen*. The investigations were confined to defects in the core of the ingot, the position and nature of which can be determined by radial and axial drilling. Non-metallic inclusions were not considered.

The principal factors affecting core soundness of large ingots were found to be: (1) the total iron content of the final slag; (2) the rate of carbon removal, and (3) the teeming temperature. Observations and tests indicated that when the iron content of the slag was less

than 7.5 per cent, about 70 per cent of the ingots were defective, and when the slag iron content was 6 per cent, all of the ingots were defective. The iron content of the slag is mainly dependent upon the lime-to-silica ratio and it is recommended that a lime-to-silica ratio of 2.4:1 to 2.6:1 be maintained, which will produce a slag containing 8 to 10 per cent iron. It is believed that the slag composition affects the under-cooling capacity of the steel, in turn affecting its primary structure.

The carbon removal rate should not exceed 0.27 per cent per hr. Rapidly decarburized melts have gaseous slags and will effuse gas

from the runner and the mold. Such melts also were found to be associated with higher temperatures, so that it is recommended that the heating gas supply be restricted when working a rapidly decarburizing melt.

The most favorable teeming temperature range was found to be from 2858 to 2912 deg. F. Teeming within this temperature range leads to the proper conditions for cooling, tending to suppress dendritic crystallization and favor solidification with a globular structure, eliminating internal defects entirely, or limiting them to such an extent that forging will eliminate them.



# New Equipment . . .

## Welding Equipment Tools

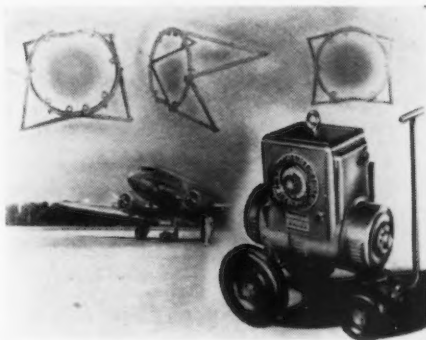
This wide range of new developments in welding and accessory equipment, brazing and flame cutting tools may show you, as a manufacturer, how you can cut your operating costs or increase your production.

**A** NEW line of a.c. 300, 500, 750 and 1000 amp. transformer arc welders has just been introduced by *Wilson Welder and Metals, Co., Inc.*, 60 East 42nd Street, New York. These Model TW welders are self-contained, designed to meet heavy arc welding needs of shipyards, railroads and steel mills, and are for 220, 440 or 550 volts, 25 or 60 cycle operation. With a wide range of current output and continuous stepless current regulation controlled by a hand crank on top of the machine, making possible a rapid shift of the setting as changes are made from one class of work to another, these new welders are claimed to operate more coolly and last longer. All units are fan cooled except the 300 amp. 60 cycle welder, and the 60 cycle units have high and low range switches while the 25 cycle units have only one range. Power factor correction is included in all models for 60 cycle operation except the 300 amp. size, and welders built for

25 cycle operation do not have corrected power factor. Efficiency of all these units is claimed to be from 80 to 85 per cent.

### Airplane Welders

**E**SPECIALLY designed for aircraft construction purposes, the "Aircraft Special," an arc welder built by *Hobart Brothers Co.*, Troy, Ohio, embodies the same design and operating speed as other

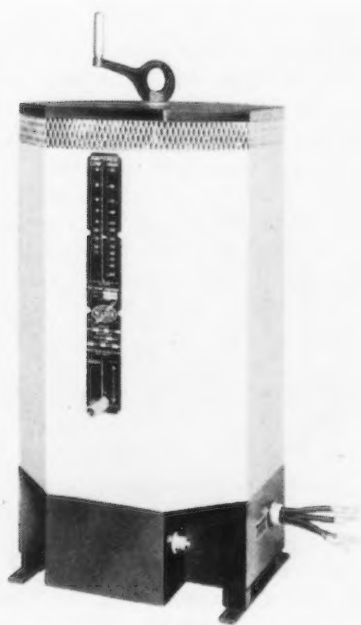


Hobart arc welders, but is modified to give the quick, hot start necessary for welding light gage alloy tubular members, and provides a lower range of welding current specified from 10 to 150 amp. at normal welding voltage. It is ideal for welding all light gage metals that are weldable by electric arc, and is especially suitable for welding X-4130 chromium-molybdenum steel on aircraft engine mounts. The unit welds well with coated electrodes of 1/32 and 5/32 in. size, without burning through and with steady progress along the seam because of its "soft arc" that hangs on even under low current conditions. Dual control of welding current and open-circuit voltage permits correct selection of volt-amp. combination for each job. Remote control makes it possible for slight heat adjustments after the hot start without return to the welding

machine. The machine is 28½ in. high and 17 in. wide, and is the multi-range type, with four laminated main poles and four interpoles. Portable models are available with steel, balloon or hard rubber tires.

### All Purpose Welder

**T**HIS new a.c. arc welder designed to give, in 30 different steps, practically any welding current required between 15 and 250 amp., is made by the *Allen Electric & Equipment Co.*, Kalamazoo, Mich. The low heat ranges make it suitable for light gage metal welding and high heats permit welding of heavy parts. Standard equipment with the unit includes 20 ft. of a.c., ground, and electrode cable and electrode holder, and hand shields, head shield, helmet lens, and other accessories are available. The welder passed the Burn-Out Test of the National Board of Fire Underwriters, and it is constructed oversize and extra heavy to meet the most rigorous industrial requirements.



## NEW EQUIPMENT

### Arc Welders

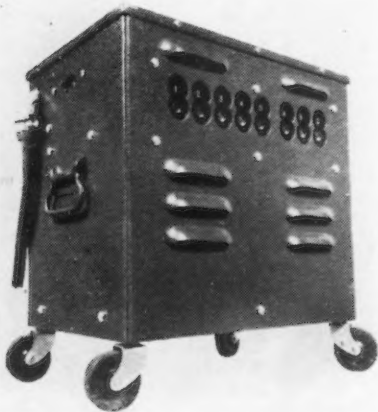
**MARQUETTE MFG. CO., INC.**, Minneapolis, recently introduced a new line of arc welding machines for 220 volt, 50 or 60



cycle operation. Welders for operation on other special voltages also can be supplied. Each welder in the series is designed for a different type of work; light service work, such as sheet metal, body and fender; heavier job welding; light and medium maintenance work in job shops, industrial and manufacturing plants, and heavy duty work, with heavy gage metals and iron and steel castings. Aluminum angle frames reduce eddy current losses, and the units are free of levers, cranks and other heat stage adjustments.

### Midget Flexarc Welder

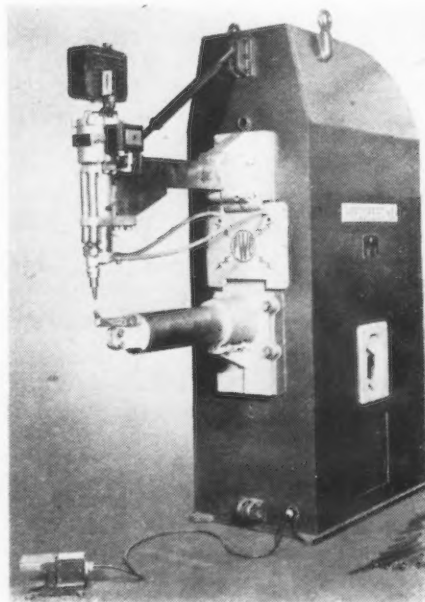
**F**OR use in welding light gage metal, castings, and drive shafts, general maintenance, and



light production work, a new Flexarc welder has been announced by *Westinghouse Electric & Mfg. Co.*, East Pittsburgh. Known as the Midget Marvel WT-1, this a.c. welder has sensitive adjustment of weld-current over a range of 20 to 140 amp., which is provided by 15 steps with correctly proportioned increments between steps. Full load rating is 110 amp., 30 min., 30 load volts, when used on 220 volt, 60 cycle lines. All accessories are provided, and the unit is 14 $\frac{1}{4}$  x 12 $\frac{1}{8}$  x 20 in., weighing 160 lb. The welder is supported on casters to facilitate mobility.

### Spot Welder

**T**O facilitate resistance spot welding inside of tanks of various types, barrels, and other deep assemblies, the *Progressive Welder Co.*, 3100 East Outer Drive, Detroit, has recently introduced a variation of its pedestal welder. This deep-

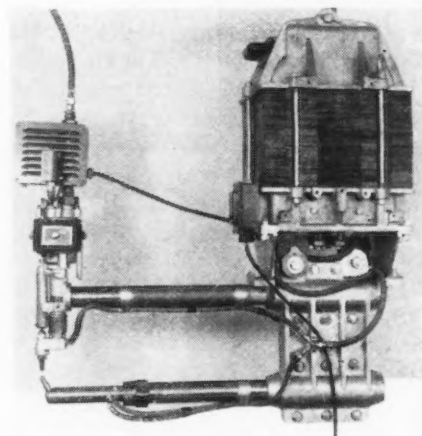


throat welder has its lower arm built of heavy tubing and fitted with a replaceable adapter for the lower electrode, making unnecessary the supporting of the lower arm with braces. Elimination of these braces makes possible sliding deep assemblies over the arm to full throat depth. The upper arm, carrying the upper electrode and gun assembly is braced in the conventional manner. Both arms are designed for in or out adjustments. Features of this welder include elimination of flexible shunts; posi-

tive hydraulic or air-hydraulic pressure at the electrodes; non-magnetic head construction, cutting of induction losses; straight-line movement of upper electrode; and positive cooling circulation.

### Portable Welders

**A** LINE of portable welding machines, with built-in transformers designed for suspension from monorails has been announced by *Progressive Welder Co.*, Detroit. These units are particularly adaptable for: spot welding large or heavy units requiring clearance



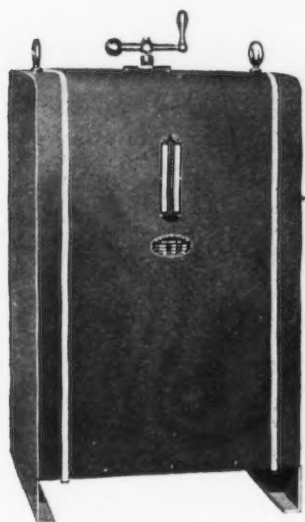
from the ground under the welding arm, spot welding parts on a conveyor, spot welding assemblies in several jigs where movement of the welding equipment is required, pinch welding of spots not accessible with gun type welders because of throat limitations, and welding jobs that can be handled most effectively by a unit suspended from overhead. This welding machine can be moved or swung around to bring the gun to the work, reducing work handling. Arms are rigidly supported and the gun is direct air operated, with the pressure cylinder, solenoid operating valve and control circuit pressure switch mounted on the gun itself. Electrode tips are water cooled and foot controls, connected by flexible cables, are mounted on the transformer. Transformers are provided with heat control selectors.

### Industrial Type Welders

**F**OUR models of industrial type welders, with power factor correction, for production work on manual or automatic welding are available in a new line of transformer type welders built by the



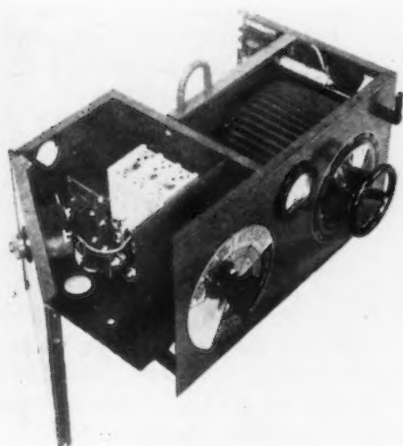
Miller Electric Mfg. Co., Appleton, Wis. These units are designed to reduce current consumption, using two-thirds as much current as standard types of arc welders. Because of the reduced kva., smaller wire, switches, cable and fuses can be used, resulting in savings in installation costs. Correct voltage for each job can be selected, affording both maximum arc flexibility and low power costs. The amper-



age can be adjusted without breaking the arc, giving an infinite number of heat stages. Being of a.c. type, difficulty with magnetic blow, slag pockets and grain structure is eliminated and strong, dense welds can be obtained. The units are built in 300, 400, 500 and 600 amp. sizes.

#### Arc Welder Control Box

**A**N improved dual continuous control for arc welding machines is announced by the Lincoln Electric Co., Cleveland. This new



control prevents accidental contact with live parts, increases accessibility, permits wiring with flexible or rigid conduit or rubber-covered multiple-conductor cable, and eliminates dangers from unintentional loosening of the lifting hook. There are separate compartments for all a.c. and d.c. circuits. The control box is permanently grounded to the motor and generator frames through the mounting bolts, making it possible to ground the control box and the machine by simply grounding the conduit which leads to the box.

#### Hydromatic Welder

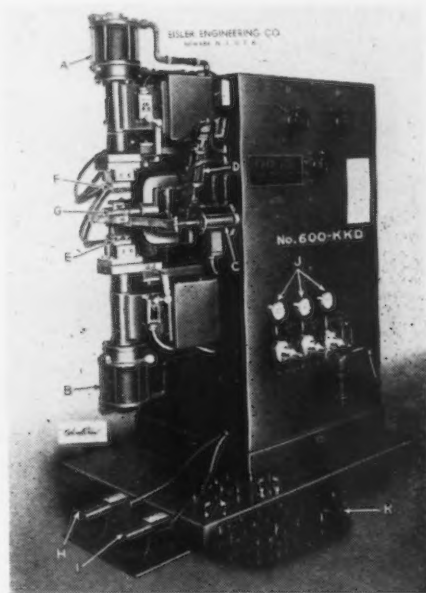
**D**ESIGNED by Progressive Welder Co., Detroit, the Hydromatic welder welds 180 complete 25 lb. shell carrying cases per hr. With 24 welds per case, the machine is thus producing 4320 welds per hr. The unit is equipped with a power-clamping fixture to



facilitate loading and unloading the cases, the parts for which are dropped over and into the loading fixture. The loading fixture forms one of the electrodes. A lever is pulled down and plates come against the work under power, clamping the parts securely against the inner electrodes. The 24 welding gun units then move in against the work and the welding cycle is started. Operation is completely automatic. The welding units, power assembly and guns are all of standard design, only the fixture and base being of special construction.

#### Fin Welder

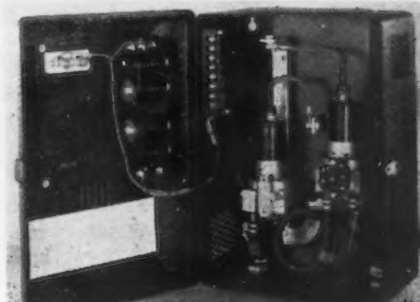
**T**HE Eisler Engineering Co., Inc., of Newark, N. J., recently marketed a special air-operated projection spot welding machine, No. 600-KKD. This machine is arranged with special welding jigs



and fixtures for welding fins to steel tubing, and no individual jig is necessary for loading the work. There are 56 points of heat control and the transformer secondary, welding dies, and mandrel are water cooled. The rotating mandrel is air operated and fully automatically controlled. The pressure for each of the four sets of air cylinders can be individually regulated and the ejector mechanism cannot operate while the welding dies are in motion or vice versa. Three fins are spot welded to each steel tube and production is about 200 finished pieces per hr.

#### Electronic Welding Contactor

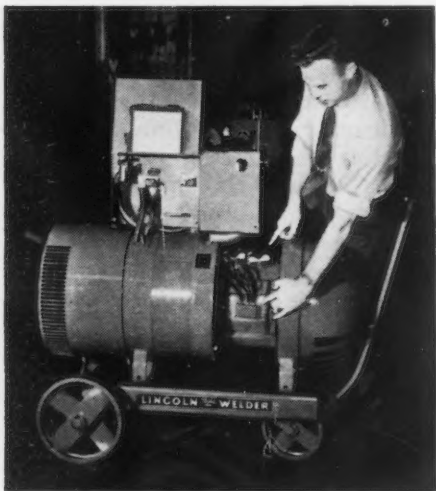
**F**OR use with timing facilities as used in spot welders, a new electronic welding contactor has been designed by the Westinghouse



*Electric & Mfg. Co.*, East Pittsburgh. Known as the SW 150 Weld-O-Trol, this unit, for spot welding applications, is rated equivalent to a size 2-W mechanical contactor at 220 or 440 volts, 50 or 60 cycles. Welding current is handled at an extremely high rate of interruption by two heavy duty water cooled ignitron tubes, which are held by water cooled clamps. The tubes can be removed without disturbing the water connections. A thermostat mounted on the cooling clamps protects the tubes against high temperatures caused by failure of the water supply. The unit is adapted for use with heat control and either synchronous or non-synchronous weld timers, including sequencing equipment.

#### Heat and Current Controls

COMPLETE protection against excessive heat or current is provided by a new protective control device for arc welding machines designed by the *Lincoln Electric Co.*, Cleveland. The control device consists of two current transformers, the primaries of which are connected with the motor leads and the secondaries supplying power to operate two snap-action thermostats that are mounted on the motor lamination. The thermostats are mounted in such a way that

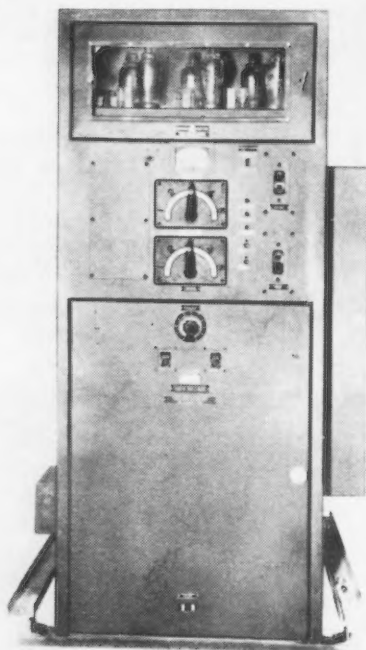


they operate by heat conduction as well as by current passing through them. After tripping open, the thermostats automatically reset when the motor returns to a safe operating temperature or when the current is reduced. A special circuit allows the starter button to be

held "in" after the thermostats have been tripped, allowing the machine to rotate with no load and the welder ventilation speeds up the cooling of the welder.

#### Welder Capacity Discharge Control

A NEW capacitor-discharge control designed for use with stored energy type resistance welding machines has been introduced by the *General Electric Co.*, Sche-

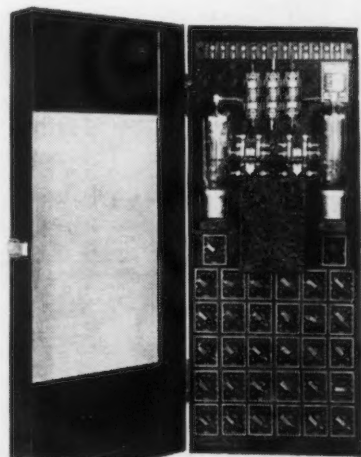


nectady. By means of this control, electric energy is stored in the capacitors of the control by a charging circuit and then rapidly released into the welding transformer, the resulting current producing the weld. The charging circuit then recharges the capacitors and the operation is repeated. The control cabinet contains up to 22 capacitors, any number of which can be used. By adjusting the voltage output of the control and selecting the number of capacitors, flexibility in welding is assured.

#### Welding Heat Controls

A LINE of resistance welding heat controls, designed to take care of virtually every application of such units to resistance welding operations is being offered by *Weltronic Corp.*, Detroit. The controls consist of three basic models: the 50-Y unit for accurate current control for single welds,

the multiple 50-W heat control for either pulsation or multi-spot welding, and the automatic heat rise control 50-XX for either single-spot or pulsation welding. A num-



ber of other models are available, such as dual and triple heat controls. All Weltronic heat controls are of the electronic type, providing an infinitely variable adjustment of current value. Their function is to "chop out" portions of the current wave to control the amount of current actually used for welding, permitting the omission of auto-transformers in the welding circuit. Electronic type of contactors must be used in the welding equipment.

#### Butt Welding Attachment

ANY rocker arm type spot welder may be quickly converted into a butt welder by removing the arms and inserting in their place the upper and lower arm sections of the new Universal butt welding attachment, made by the *Universal Power Corp.*, Cleveland. The entire operation is automatically carried out by motion of the upper arm, eliminating the need for cables or rods. By engaging the foot pedal, the jaws clamp simultaneously, movable die is pushed toward the stationary slide, weld current is applied, and the weld and upset are completed. The slide is then pulled back ready for the next weld. The attachments are available in two sizes, 2 to 10 kva and 12 to 25 kva, the first for  $\frac{3}{8}$  in. and the second up to  $\frac{3}{4}$  in. solid stock. The jaws of the larger unit can be extended to 1 in. diameter, and both units may be used for making butt welds on tubular stock.

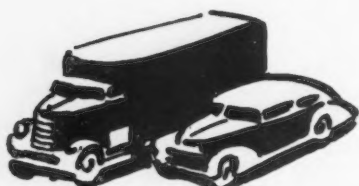




**A TRUE EYE FOR BRASS.** In every department at Revere Copper and Brass Incorporated you will find men who have a "knack" for brass. Men like Peter Gura, for instance, who has been with Revere for thirty-five years—a man whose eye can tell to a hair when a brass shape is out of true, and who can set it straight as a plumb line with a practiced twist of his hands. In operations such as this, which would baffle a machine, Revere sees an opportunity to put an extra ingredient—the *human touch*—into copper and copper-base alloys. That is one of the many reasons why Revere materials are so trustworthy in strengthening America's defense, and why the end of the emergency will find Revere so well prepared for the advancing needs of industry. Revere Copper and Brass Incorporated, 230 Park Avenue, New York.

# Assembly Line . . .

• The Big Three in the automobile industry move into airplane production, with plants, equipment, and facilities in many cities throughout United States. Tooling up, which began some months ago, nears completion in many of these plants and production is under-way.



**D**ETROIT—First of the Big Three of the automobile industry to get into production on bomber parts in the national defense program is the General Motors group. Last week Edward F. Fisher, general manager of Fisher Body Division of General Motors Corp., announced that the Memphis Aircraft Division has begun shipments of bomber sections to Kansas City, Kan., for assembly into North American B-25 bombers.

Thus Fisher joins with Briggs Body, which has been shipping wings to Vought-Sikorsky for months, and Murray Body, which recently shipped its first pair of wings, is contributing importantly to the national defense program. This comes of something of a surprise because, as recently as October 16, we said in this column that Ford appeared to be in the van in the aircraft production race (with Chrysler and G.M.) having announced that the first Consolidated airplane would be completed sometime about next May. But Fisher's progress report shows that the G.M. family group (North American is also a G.M. subsidiary) is leading.

Fisher production is already on an important scale, although tooling of the plant at Memphis is not complete. Initial output at Memphis includes 21 different types of bomber sections. As the work progresses a total of 69 different types

of sections will be made in the plant and eventually the assemblies produced by Fisher will comprise about 55 per cent of the finished bombers, excluding engines and instruments, and using man-hours as a basis of measurement.

The sections being produced by Fisher range in size up to the 19 ft. outer wing panel assembly.

Most of the presses, routers, shears and machine tools are now in the plant, according to L. T. Dalecke, resident manager. About 750 hand riveting guns, 230 portable squeeze-riveters and 800 drills are on hand, while several hundred more riveting guns and drills are on order. Some 200 jigs and fixtures are already in the plant, representing about 10 per cent of the eventual equipment of this nature. About 1800 more jigs and fixtures are still to be delivered, most of them being made now at the Fisher plants in Detroit. The Memphis plant is now employing 891 persons and at its peak will employ 4000 workers, with 6000, in all, to be employed on G.M.'s airplane program. For years the Memphis plant has been a wood-working plant and the current change represents a distinct transition in its manufacturing processes. A plant addition that will increase floor area from seven acres to more

than 14 acres is expected to be ready Feb. 1.

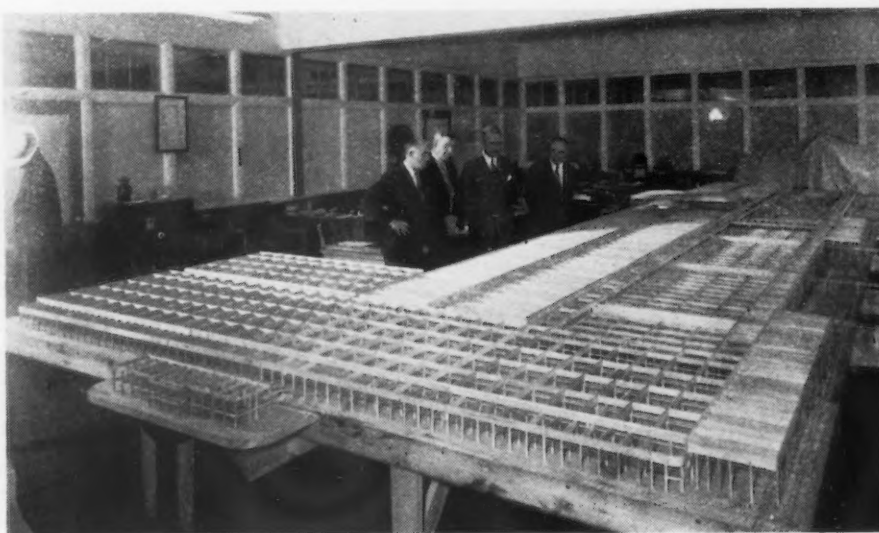
Sub-assemblies from this plant will be shipped to the new North American plant in Kansas City, which is nearly ready for its dedication. Here other parts will be assembled with these to form the airframe of the medium, two-engine Army bomber.

**F**OR the statistically inclined the following is offered. The 19 ft. outer wing panels each contain more than 1200 aluminum parts, not counting some 20,000 attaching parts such as rivets and washers. About 15,000 of these are rivets. Each shipment of completed sections for one bomber will have 18,000 parts and 107,000 rivets.

Although the program was initiated by Fisher and North American last winter—when the Automotive Committee for Air Defense was active—it was June before the plant was ready to hire any workers and July 15 before any parts were produced. The first shipments of finished sections of planes, occurring within the past week or so, came three and one-half months after the first parts were produced.

Eight other Fisher plants besides the one at Memphis are participating in the bomber program. The Detroit Aircraft Unit is to produce

**MODEL PLANT:** This wooden scale model of the new \$47,000,000 bomber plant which Ford Motor Co. is building near Ypsilanti, Mich., was constructed to help engineers visualize the problems involved in preparing for the manufacture of Consolidated B-24D four-engined bombers. Shown studying the model are W. Pioch, tool design department chief; Logan Miller, superintendent; C. E. Sorenson, Ford vice-president, and H. B. Hanson, of the power and construction department.





**He depends on the precision in  
Pratt & Whitney Bench Lathes**



**T**HIS man is making small precision parts that will assemble into fine measuring instruments important to defense work. Speed is necessary . . . but no sacrifice of accuracy can be permitted. The Pratt & Whitney Precision Bench Lathe is doing the job . . . doing it 24 hours a day.

These small machines are tough, rigid and accurate. They need only a little shop space because of their compact under-the-bench motor drives. They release larger lathes for the bigger jobs, but they will handle a surprisingly wide range of work.

Write for complete information.

**PRATT & WHITNEY**

*Division Niles-Bement-Pond Co.*

**West Hartford, Conn.**

**Instrument Maker . . . — at work**



86 smaller bomber parts. About 150 men are now employed on this work and at peak production, the total employment will exceed 900. These pieces will be shipped directly to Kansas City for assembly, as will about 16 small parts from Ternstedt Division in Detroit. Ternstedt is also producing aluminum die castings and jigs, fixtures and tools.

Deep drawn aluminum parts for Memphis and Kansas City are being produced in Fisher's Detroit stamping plant. The Detroit Die & Machine unit is machining forgings. Dies, jigs, fixtures and tools are being produced by the Detroit plants, as well as by Fisher units in Pontiac and Flint. It is expected that all the jigs necessary for the program will be completed by the end of next month and the production of dies will be completed by the first of next year. One other General Motors unit is contributing to the bomber program. This is the Chevrolet Forge Shop at Muncie, Ind., which is making aluminum and molybdenum steel forgings.

There are a lot of elements to be marshalled into proper position in shifting production from civilian items to specialized defense projects. K. T. Keller, president of Chrysler Corp., has outlined an intimate picture of what this represents in the Chrysler Corp.

The first yardstick is the manufacturing set-up. In this instance there are 19 manufacturing plants in the United States located in the Detroit area, Dayton, Marysville, Mich., Evansville, Ind., Newcastle, Ind., Kokomo, Ind., Helena, Ark., San Leandro, Cal., and Los Angeles. Now that the defense program is underway, Chrysler also has on its list the tank arsenal, the bomber fuselage plant, the aluminum forging plant, two new gun arsenal plants and the new engineering plant for aircraft engine development.

These plants were engaged in turning out between seven and eight hundred million dollars worth of products a year, consisting of motor cars, trucks, marine engines, industrial engines, heating apparatus, air conditioning apparatus, Oilite bearings and other powdered metal parts. With the defense program part of the daily operations now, the plants are engaged in actual defense production, as well as

a great deal of research, including engineering on Army tanks, anti-aircraft guns, bomber fuselage sections, command reconnaissance cars, field radio cars, troop and cargo motor transport, weapon carriers, ambulances, Army carry-alls, duralumin forgings, powdered metal parts, cantonment furnaces, field kitchens, tent heaters, refrigeration compressors, marine and industrial engines.

There are more than 80,000 employees engaged on this work on these many products and Keller quotes one of his plant managers as saying, "That's a lot of people if you do nothing else but count them."

**K**ELLER does more than that. He offers the following breakdown, in five major groups:

(A) 1000 in sales promotion and advertising; 1800 stenographers and typists; 6000 clerks and other office employees; 1300 janitors and clean-up people; 11,000 material handlers and truckers; 17,000 assemblers; 8000 body painters, trimmers and assemblers; 800 plant protection men; 100 doctors and nurses.

(B) 21,000 machine operators

**BACK TO WORK:** Army officers post a proclamation as they take over, under President Roosevelt's instructions, the strike-bound Bendix, N. J., plant of Air Associates, Inc. With U. S. troops guarding the plant, production has been resumed on vital defense products.



who have learned to operate various classes of machines when the machines have been set up and adjusted; 7000 operators who can set up, adjust and operate equipment after it has been planned and the special tooling for it has been designed and made; 1300 tool, pattern and die makers.

(C) 50 manufacturing executives and plant managers; 500 master mechanics, tool and die engineers; 3000 superintendents, foremen and assistant foremen; 1300 engineers, laboratory technicians, designers and draftsmen.

(D) 1200 employed in gray iron foundry.

(E) 1800 miscellaneous.

Keller also has analyzed the positions of these 83,850 workers in regard to the defense program. Group A, totaling 47,000 employees, is a group which, in varying degrees, is going to be very much affected by the curtailment of automobile production, he points out. Group B consists of 29,000 employees who can be most quickly adapted to new defense jobs. Group C, including the executives, master mechanics and engineers, about 1850 in all, is the one now carrying the burden of preparing the plants for change-over to defense work.

Keller, a manufacturing executive who knows his shops thoroughly, also has the following to say about the machines used in manufacturing cars and trucks, covering them in general terms so grouping is possible. Of the 15,000-plus machines in Chrysler plants there are: 2500 machines for turning round pieces; 3300 machines for drilling holes; 2100 machines for grinding pieces to improve their finish and get very accurate dimensions; 1100 machines for cutting gear teeth; 1800 machines for milling or shaping flat surfaces; 140 machines for sawing metal; 250 machines for forming hot metal to shape by forging; 1900 machines for forming cold metal to shape by pressing, and 2200 miscellaneous and specialized pieces of equipment.

Automobile production showed a very slight improvement last week over the output rate prevailing this fall. Assemblies totaled 93,585 passenger cars and trucks in the United States and Canada, compared with 92,879 in the previous week and 123,448 in the corresponding week of last year, according to Ward's Reports, Inc.



There must be a mighty good reason why Carpenter Stainless is entrusted with those jobs where unfailing performance is demanded.

Take, for example, the delicate mechanism housed in the glass tube which controls the modern magic of radio broadcasting. Through its fine adjustment and perfect functioning it holds the frequency of the broadcast right on the nose.

To get this kind of performance—the maker of these thermostatic control tubes chose Carpenter

*Wherever*  
**PERFORMANCE**  
*is vitally*  
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**YOU FIND**  
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Stainless Steel for the precision parts shown.

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Whether your work calls for the making of small precision parts or giant turbine blades of Stainless Steel, the dependable uniformity of Carpenter Stainless makes fabrication easier — production costs lower.

THE CARPENTER STEEL COMPANY • READING, PA.



*Carpenter* **STAINLESS STEELS**

BRANCHES AT Chicago, Cleveland, Detroit, Hartford, St. Louis, Indianapolis, New York, Philadelphia

# Washington . . .

• Government moves to cram 35,000 new employees into Boomtown on the Potomac, where every nook and cranny is already occupied . . . Total civilian payroll alone is \$2,000,000,000.



**W**ASHINGTON — Boosted by 60,000 in 15 months, Boomtown on the Potomac, nee Washington, already over-stuffed with more than 200,000 government employees, is going to take on 35,000 more, according to reports, even though no one seems to know where they will be put since the government now occupies every crack and crevice that can be found and is rushing the construction of "temporary" buildings.

At the new five-story Social Security Building, grabbed by OPM, messengers, clerks and typists have overflowed into corridors, and this is true of the crowded condition of other government agencies. Both business callers and the government workers are compelled to move with care to avoid collisions. Yet OPM is planning to add at least another 4000 to its payroll in Washington.

The civilian payroll of the War Department increased from 142,649 in July of last year to 328,219 in July of the present year. The Navy Department personnel ballooned from 126,211 to 233,467. Even old established departments, not associated with military problems, have wheedled themselves into the national defense category, and have increased their personnel making feints at getting out "vital" defense reports.

**T**HE radio and the movie obviously are the vehicles for the creation of other bureaus. Government press agents and their staffs represent a population of some 1000. The "information services" altogether cost something in excess of \$10,000,000. George Creel has said that his Bureau of Information, which handled all government press work in the first World War, cost only \$76,000 for two years.

The total civilian payroll alone is estimated at about \$2,000,000,000. The Joint Congressional Economy Committee recently asked the Budget Bureau to report on a request—a mild request indeed—for ways of slashing non-defense expenditures by \$1,000,000,000 to \$2,000,000,000. The bureau report read like a political creed which makes economy a crime. The bureau gravely stressed the "drastic" nature of the cuts and figuratively wept over the "unfortunate" results of making the suggested percentage cuts in farm subsidies, work relief and public works funds.

**T**HE committee has asked the bureau to make another effort. Request has been made that the bureau do less generalizing and get down to cases. The committee has not been sold by any means on the idea that the non-defense expenditures can't be slashed by \$1,000,000,000 at least, and perhaps by \$2,000,000,000. It's not only the waste, extravagance and enormous costs that worry the committee (and taxpayers as well). Even bigger than this important item is concern over the connotation of erecting an overwhelming political bureaucracy that

comprehends a nation of government wards.

It perhaps is an underestimate rather than the contrary that 20,000,000 people or approximately 15 per cent of the country's population are getting benefit checks, pensions or pay from the Federal Treasury. In this is seen the implication of totalitarianism, the very thing that has inspired the war against the Axis powers. Except for the political or financial beneficiaries, the public does not want any sort of strutting dictatorship, whether domestic or imported.

**S**EEING the trend, it does not respond as it would otherwise, to appeals to make sacrifices. It sees rather internal as well as external dangers and wants the sacrifices so urgently asked of them to be shared by those in power.

With a big boost in taxes, it is estimated that practically 38 per cent of practically every taxable worker's earnings will go to the Federal Treasury. Lacking one hour, half his work will be a contribution to the government. Specious argument that this contribution should be made cheerfully to preserve our form of government carries no weight since non-defense expenditures the past eight years have far exceeded income.

It's long past time, if the desired unity and sacrifices are to be achieved, that the government pull in its belt, forget politics for the duration, reorganize on a lower-cost and more efficient basis and get down to the defense job in a realistic, earnest effort. It may be later than the government thinks.

**VEST-POCKET LANDING FIELD:** Expanded steel strips 16 in. wide and 10 ft. long are used by the Army to construct emergency landing fields.

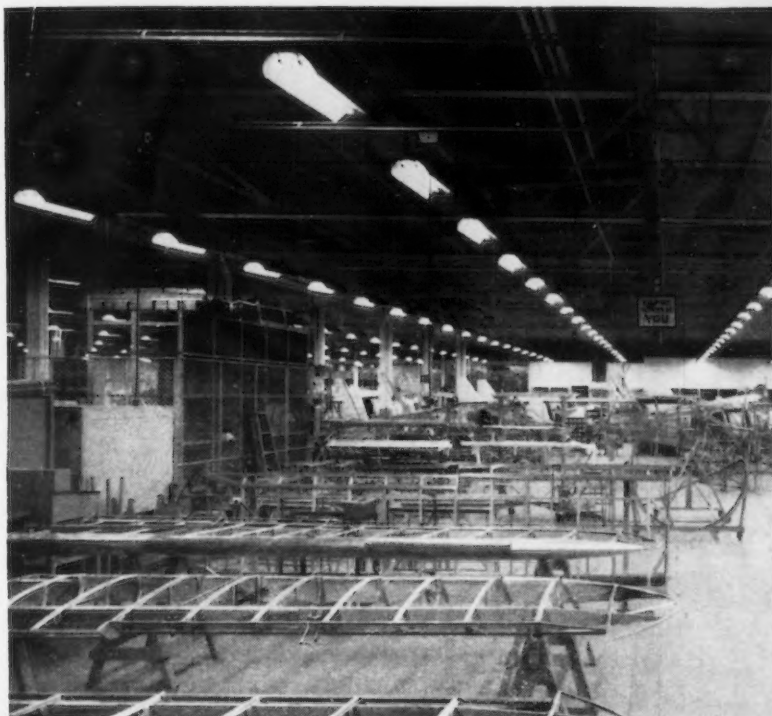




**SEE HOW CLEARLY GENERAL  
ELECTRIC RF FLUORESCENT  
LIGHTING HELPS YOU READ  
THIS SCALE . . .**

**A**T the Stinson Aircraft Company's Wayne, Mich., plant, General Electric's RF (rectified fluorescent) lamps provide 30 footcandles of "indoor daylight" to speed defense work. In this unretouched photo of the cross-feed dial on a typical lathe, note how clearly RF lighting reveals the markings, making them easy to read quickly and accurately.

The illustration below shows how this lighting produces little shadow and brings out every detail of the plane, including fuselage and wing construction.



Let General Electric show you how you can speed production, reduce errors, and improve morale in your plant with higher lighting level that is "better than daylight" because it is efficient, economical and dependable. Your local electric service company or your G-E MAZDA lamp distributor will show you how to get these higher lighting levels, either with RF fluorescent, or G-E MAZDA F lamps, incandescent lamps or mercury lamps, or a suitable combination . . . *engineered to your needs.* General Electric Company, Nela Park, Cleveland, Ohio.

**AT LEFT:** General Electric RF (rectified fluorescent) lamps in two-lamp luminaires are spaced on 10' x 15' centers and mounted at a height of 13' 6". RF fluorescent lighting is cool, efficient, and economical.



**GENERAL ELECTRIC MAKES ALL TYPES OF LAMPS** to provide "better than daylight" for industrial lighting. These lamps include: (1) G-E MAZDA F (fluorescent) lamps, (2) RF (rectified fluorescent) lamps, (3) MAZDA C (filament) lamps, (4) MAZDA H (Mercury) lamps. See your G-E MAZDA lamp distributor for complete details.



**GENERAL  ELECTRIC**

## Cobalt Placed Under Direct Allocation

Washington

••• The OPM's direct allocation system was further extended last week when cobalt was added to the list of products being distributed under that method by the Director of Priorities.

General Preference Order M-39 places domestic and imported ore and concentrates, cobalt metal, and cobalt chemical compounds, under mandatory control and restricts deliveries and acceptances of cobalt for metallic uses to specific authorizations.

Fifteen hundred of the 1700 tons of cobalt now being produced annually in the United States come from ore imported from Africa. Domestic ore is limited to a small area in Pennsylvania where it is produced as an iron by-product. Canada produces some cobalt but all of it is being used for war purposes there and in England. Low grade ore deposits exist in Canada and could be placed in production as an emergency supply for the United States.



Wide World

**COAL STRIKE CONFERENCE:** Irving S. Olds, chairman of the board of United States Steel Corp., and Eugene G. Grace, president of Bethlehem Steel Corp., photographed as they appeared, with other members of the steel industry, at the closed sessions of the National Defense Mediation Board during attempts to settle the captive mine strike dispute.

## Oil Line's Death Saves Much Steel

Washington

••• SPAB's final disapproval last week of the Ickes-proposed oil pipe line, from Texas to Philadelphia and New York will save more than 660,000 tons of steel ingots for vital defense needs, according to Leon Henderson.

SPAB held that the value of the line as a defense project was not great enough to justify the high priority ratings that would be necessary. The board said, however, that it recognized the vital importance of assuring the eastern seaboard region an adequate supply of oil, and requested Petroleum Coordinator Ickes to explore the possibilities in other transportation methods such as greater use of railroad tank cars, possible construction of concrete oil barges, and the possibility that boats of the "sea otter" type could be used to carry oil. It also cited savings which might be made through re-conversion to coal of certain eastern industrial plants.

It was also pointed out by SPAB that it may be advisable to build short pipe lines to link sources of supply with markets in such a way as to ease the eastern oil supply at a comparatively minor expense in materials.

## THE BULL OF THE WOODS

BY J. R. WILLIAMS



## OPM Extends Orders on Trucks and Trailers

Washington

••• Extension of the orders to facilitate production of heavy motor trucks, medium trucks, and truck trailers until Jan. 31, 1942, so that manufacturers may place January orders for steel immediately, was issued by OPM last week.

The extension of order L-1-a to Jan. 31 means production may be five-sixths the number of units produced during the first half year, except trucks ordered for specific defense purposes and heavy motor trucks are not limited. The extension of P-54 means that production of replacement parts may equal the same number of parts sold for replacement purposes during the first half year.



## Secret Air Cooler Being Developed

Buffalo

• • • A secret type of air cooler, known as an intercooler, for turbo-superchargers for sub-stratosphere flying of military aircraft, is being developed and soon will be placed in production at the Fedders Mfg. Co. plant here, Fedders executives said this week. The turbo-super-charger rates with the Norden bombsight as a closely-guarded ordnance secret.

## New Plant Agreements Authorized by DFC

Washington

• • • The Defense Plant Corp. has authorized the execution of the following lease agreements at the request of the Government organization indicated in parentheses:

American Steel Foundries, increase in commitment from \$9,413,901 to \$18,486,166 (War Department) for additional facilities for plant to be located at East Chicago, Ind., for use in production of tank equipment.

General Motors, Fisher Body Division, \$25,782,244 (War Department) for construction and equipping of a plant at Flint, Mich., to be used in the manufacture of tanks.

Vanadium Corp., \$725,000 (OPM) for construction and equipping of plant at Monticello, Utah, to be used in production of vanadium pentoxide.

Wright Aeronautical Corp., increase from \$3,425,000 to \$8,399,200 (War Department) for additional facilities at East Paterson, N. J.

Willis-Overland Motors, Inc., increase from \$1,700,000 to \$1,979,759 (War Department) for additional equipment for plant at Toledo, Ohio.

Boeing Airplane Co., increase from \$272,500 to \$401,400 (War Department) for additional machinery and equipment for plant at Wichita, Kansas.

Bendix Aviation Corp., Julien B. Friez & Sons Division, \$380,716 (Navy Department) for construction and equipment of plant at Baltimore for manufacture of aircraft equipment.

A. W. Hecker, \$199,130 (War Department) for acquisition of machinery and equipment in manufacture of aircraft equipment.

## OPA Advises Against Price Boosts in 2 Lines

Washington

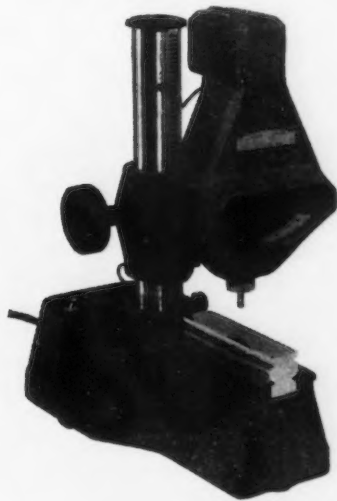
• • • Manufacturers of domestic cooking and heating stoves and of radios were requested not to raise prices of their commodities above the Oct. 24 and Oct. 15 levels, respectively, in a telegram Nov. 6 by Leon Henderson.

# Attention



The attention of industry is being called emphatically to the urgent need for accurate and rapid inspection at tolerances never before encountered in a period of rapidly expanding production.

In order to handle this tremendous volume of gaging operations with the highest degree of precision, gages such as the Sheffield Visual Gage are absolutely essential. The Visual Gage is highly sensitive, instantaneous in its action and deadily accurate (checking to thousandths, "tenths" and millionths of an inch). It is used for checking dimensions of manufactured and purchased parts, tools, production and master gages.



At the same time it is very simple in construction, can be handled easily by anyone familiar with inspection work, and is extremely durable.

The Reed Mechanism (the heart of the Visual Gage) is positive in action and entirely free from the limitations of frictional wear. It contains no gears, knife edges or rubbing contacts—nothing to wear out of adjustment. Measurements by the Visual Gage are always consistent and thoroughly reliable. It is one of the most efficient instruments available to inspection.

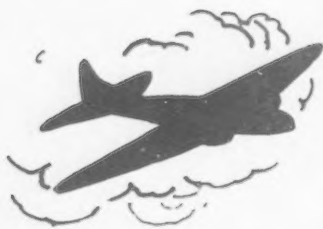
Write for details

THE SHEFFIELD  
CORPORATION  
Gage Division • DAYTON, OHIO, U.S.A.



# WEST COAST

• Blighted areas, due to inability of firms to get into defense program, will be few on the Coast . . . Mills are showing ingenuity in meeting the tight scrap situation.



WHATEVER may be the future of individual industrial firms on the West Coast unable to adapt themselves to defense production and unable to obtain necessary materials to continue domestic production, little likelihood exists that there will be any blighted areas characterized by community unemployment.

Individual troubles show signs of increasing, but, as THE IRON AGE reported a month ago, shutdowns so far have been limited to smaller plants.

The Federal Reserve Bank attributes the relatively fortunate position of the Coast with regard to depressed areas to two factors. The first is the comparative unimportance of vulnerable industrial activities in the local economy; altogether, employment in consumer goods industries which might be affected is about 3 per cent of total factory employment in this section of the country. The second factor is the distribution of those activities which are, for the most part, located in industrial areas where defense production continues to expand and take up any employment slack as fast as it is created.

The most unexpected shutdown has been that of a farm machinery manufacturer specializing in disk harrows particularly suited to California agricultural conditions. Failure to obtain special seamless tubing under the B-1 priority accorded

farm machinery manufacturers, and inability to make substitutions, caused the closing. One of the biggest headaches in administering the proposed farm equipment material allotment program will come from this area where approximately 20 per cent of the machinery is semi-custom manufactured to handle specialty crops and unusual soil and contour conditions.

MILLS are showing great ingenuity in meeting the tight scrap situation. A San Francisco district mill is melting several thousand tons of armor plate furnished by the Navy in order to roll reinforcing bars for Navy projects. Another mill in this district scoured the Hawaiian Islands for scrap supplies, and is reported to be importing several thousand tons.

Violations of the OPA scrap price schedule are reported by northern California foundrymen to have decreased during the past three weeks. The time of cessation corresponds with a visit of an OPA representative to the Pacific Coast.

That ordnance manufacturing in the far West has by no means reached its limit, is indicated by figures showing that 26 manufacturing concerns in the region, most of them on the Pacific Coast now have prime Army ordnance contracts compared to 214 firms able to undertake them. The possible spread of sub-contracting of this type of work is even greater. Twenty-one firms now have sub-contracts, whereas 312 facilities possibly could undertake them.

The task of spreading this type of work is by no means as easy as has been painted. Production considerations make it highly desirable that shops undertaking this type of work set aside a portion of their plant to be devoted entirely to it, rather than intersperse it with their normal production of domestic goods. The problem of working out contracts with associations or pools is even tougher. Here, again, centralization of production facilities, if possible under one roof, is regarded as desirable. Unless individual pool members are decidedly up against the wall, they are likely to be loath to disrupt their own operations in order to undertake cooperative work. From the management angle, pool members

who have been competitors face the necessity of overcoming long standing antipathies, conceding techniques, and working cooperatively. The problem of financing pools in this region, at least, seems to be more easily overcome. These are some of the reasons why, as yet, production pools have little to show in the way of definite contracts.

TENTACLES of the United Welders, Cutters & Helpers Union strike which had reached into shipyards up and down the Coast with varying degrees of effectiveness last week seemed to be withdrawing in a fashion as unorthodox as that in which they appeared. At Los Angeles members of the UWCH voted to return to work pending a conference under the sponsorship of the OPM scheduled for Nov. 17 at which the dispute of the independent union with the AFL would be settled. The related Seattle Council of Welders & Burners voted against returning to work, but members appeared to be drifting back to the yards of their own volition. By the time this appears in print, serious aspects of the situation there will probably be dissipated. The sister strike of an affiliated independent union, the United Aircraft Welders, against Lockheed and Vega at Burbank, Cal., and Consolidated Aircraft at San Diego has an uglier aspect. Called a "wildcat" strike by OPM Director Sidney Hillman, this dispute might be better termed a "spontaneous" demonstration. Inasmuch as the welders seek recognition for their union in these three plants where the AFL has blanket contracts, this strike, like the shipyard strike, may indicate "fatigue cracks" in the AFL organization. Strength is lent to this interpretation by the flight of William Green from the Pacific Coast when the possible serious aspects of the situation became apparent.

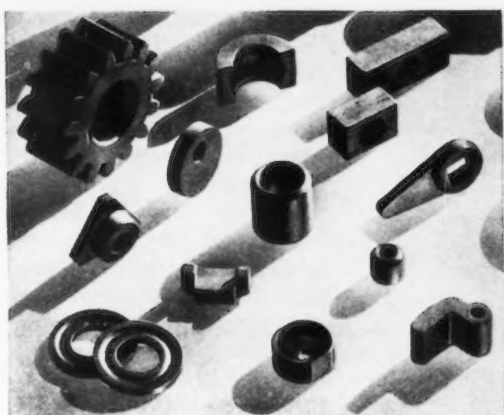
Whatever interpretation labor scholars may give, little solace is given to the management of the affected plants. Not only do the striking welders represent a substantial investment in training in aircraft techniques, but they present a graphic argument that NLRB designation of a bargaining agent and the signing of a contract with the designated agent by no means assures the continued grip of the agent union upon its mem-



**DIFFICULT CONTOURS  
HIGH HARDNESS  
CLOSE TOLERANCES  
MIRROR FINISH**



Produced without machining in  
this **DUREX IRON  
CAM**



• A few Durex Iron parts, made by compressing metal powders in dies, then heating under precise control of temperature and atmosphere. Many costly and time-consuming machining operations are avoided, and scrap loss is eliminated.

• Many parts produced by casting and machining or die cast from materials now hard to obtain, can be made readily and economically from iron powders. The Durex Iron Cam shown above is one of many parts engineered by Moraine from metal powders to provide new combinations of physical properties, new designs, and production economies.

*What can Durex Iron parts do for you?* Depending on the application they may replace parts made from vital materials . . . do an equivalent or better job for less money . . . simplify designs . . . speed up assembly operations . . . extend the life of moving parts through self-lubrication . . . release hard-pressed machines for the production of parts by other methods.

Check Durex Iron as applied to your specific requirements. Write today for Form 102-A, a valuable, factful bulletin on Durex Iron parts and applications.

# MORaine

*Pioneer in Powder Metallurgy*

MORaine PRODUCTS DIVISION, GENERAL MOTORS CORPORATION, DAYTON, OHIO

bers. Consolidated met the problem by notifying the welders that any worker walking out "as a result of an unauthorized call by an outside organization will forfeit all rights as an employee."

**C**ONSTRUCTION of 24 escort vessels for Britain at the Mare Island, Cal., navy yard and eight at the Puget Sound navy yard, Bremerton, Wash., will require substantial expansion at both yards. Mare Island contemplates construction of five double ways, each 290 ft. long, and machine and electric shops. Two ways will be built at Bremerton. The vessels will cost approximately \$6,000,000 each. In addition to the 32 ships built on the Pacific Coast 12 will be built in Boston and

six in Philadelphia navy yards. Already serious housing problems for workers at both Bremerton and Mare Island will be intensified. For instance, Mare Island now employs 25,000 workers, larger than the entire population of the City of Vallejo which adjoins the yard. Puget Sound yard officials are quoted as stating that work under the shipbuilding contract will be given a higher priority rating than work for the United States Navy. If this is true, it may be an indication that the "AA" rating long held up its sleeve by the priority division may be assigned.

The new navy yard undertakings further emphasize the gradual creeping up of shipbuilding on aircraft as the Coast's biggest em-

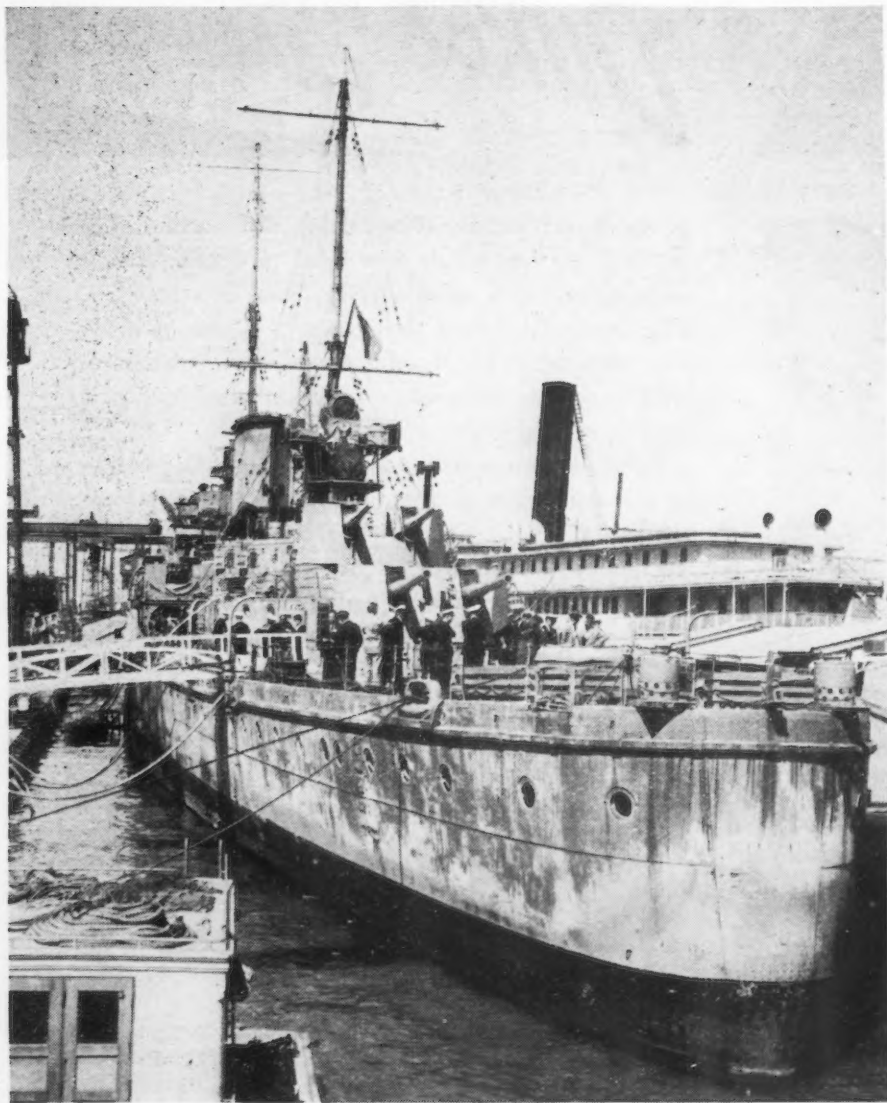
ploying industry. In August, Pacific Coast aircraft factories employed 115,000 workers, shipyards 70,000 workers and metal working plants 91,000 workers. But in September, California aircraft employment only doubled while shipyards increased 234 per cent compared to September, 1940. The shipyard expansion is regarded as somewhat more beneficial to the general economy, for California shipyard workers averaged \$49.47 a week in September while aircraft workers averaged only \$37.15. The average work week in shipbuilding was 43.2 hours; in aircraft, 45.5 hours.

**W**ORK will finally get under way this month on the 90 million pound aluminum reduction plant at Troutdale, Ore., being built for the Defense Plant Corp. by the Aluminum Company of America, T. B. Parsons, construction engineer, said last week. Erection of steel is not scheduled to start until January, and it is likely to be well over a year from the time the project was first definitely proposed until it begins adding to America's aluminum production.

It is now rumored that expansion of Columbia Steel Co.'s pig iron production facilities at Provo, Utah, by 725,000 tons annually will be carried out by erection of two new 1000-ton blast furnaces, rather than by transporting old furnaces from either Joliet, Ill., or Edgar Thompson Works at Pittsburgh. If the report is true—it cannot be confirmed here—it may reflect a decision of the steel corporation to rehabilitate the Eastern furnaces at their present location. Although overcrowding of present ore transportation facilities might present difficulty in supplying the furnaces during the winter months, it is possible rail transportation of ore in special cars or use of thawing sheds might make possible their utilization, although at high cost. In this way, it is suggested, possibly a million tons of pig iron could be produced during the 18 to 24 months' period before the furnaces could be put into production at Provo. Furthermore, it is argued, since the Provo pig iron capacity is intended to supply the new steel plant to be operated by Columbia at Pittsburg, Cal., new furnaces could be built at Provo by the time the Pittsburg open hearths and finishing facilities are completed.

**RECUPERATING:** The British cruiser HMS Orion, damaged in the evacuation of troops from Crete, is shown here being repaired at the Mare Island Navy Yard, California.

Wide World





# SALT BATHS FOR SHELL NOSING!



## ANOTHER AJAX ACHIEVEMENT ... WHAT IT MEANS TO YOU WHO FORGE AND SHAPE SHELLS



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SIMULTANEOUS BRAZING  
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•  
NEUTRAL HARDENING  
•  
CYANIDE HARDENING  
•  
SELECTIVE HEATING  
•  
AGE HARDENING  
•  
TEMPERING  
•  
HARDENING HIGH-SPEED  
STEEL TOOLS  
•  
ANNEALING  
•  
BRAZING  
•  
HEATING FOR FORGING

**NOTE:** Many installations of the type shown are now in production heating (for nosing) a wide variety of shell and bomb forgings. These include 105-mm, 155-mm, 5-in. A.A. shells and 14-in. demolition bombs. This salt bath equipment has complete peacetime salvage value and is available for mechanized as well as batch operations.

The advantage of this process will be of interest to all who forge and shape shells:

1. Elimination of rejects hitherto caused by eccentricity, wrinkling, linear distortion . . . no over- or underheating thick or thin areas is possible with shells immersed in this liquid medium at temperatures held to close limits (5° or less).
2. Formation of surface scale—especially inside, where defects are hardest to remedy—is eliminated.

Selectively heating 155-mm shells for nosing . . . at temperatures 500° lower than those once considered necessary. Output: 40 shells an hour—one of a large battery installed in a Toledo automotive plant whose production of shells is making history.

3. Very rapid heating (from both inside and outside of shell wall) with sharp break between heated and unheated portion.

4. All the other inherent advantages of heating by the Ajax-Hultgren electric salt bath furnaces, described in Catalog 107.

Send for Catalog 107 and list of installations. But if you are interested in immediate quotations, let us know desired hourly production and type of power supply. Cold forming of shells is on the way out!

### ...Also — ARMOR-PIERCING SHOT!

and economic advantages over any other heating method. Investigate at once.

The Ajax-Hultgren Furnace for hardening 37-mm and 75-mm A.P. Shot has proved its many technical

**Ajax Electric Co., Inc., 900 Frankford Ave., Philadelphia, Pa.**



## THE **AJAX** ELECTRIC SALT BATH FURNACE HULTGREN

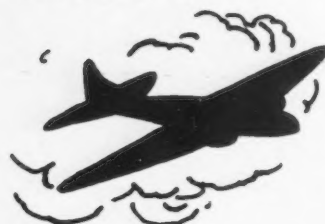
### ASSOCIATE COMPANIES:

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AJAX ELECTROTHERMIC CORPORATION, Ajax-Northrup Induction Furnaces for Melting, Heat-Treating

# Fatigue Cracks

BY A. H. DIX

## Feet In The Clouds



I wish the pilot of the bomber on page 68 of your Oct. 23 issue would stop his stunting. He has been flying on his back ever since the copy came in and the strain on his blood vessels must be terrific.

—N. B. Winkless

The cut was not placed upside down through error. Your favorite family journal never errs. Art Editor Winters explains that the aviator is merely at the top of an inside loop, and is shown in that position because the illustration was used in the West Coast section, which in the Oct. 23 issue dealt largely with a disturbed labor situation. The reversed cut typifies the topsyturvy conditions.

## Night Shift

••• No new 2nd lt. ever examined a rifle barrel as closely as the pages of this omniscient organ are being scanned these days. Reader interest is incandescent and the slightest fleck on a superfinished surface of perfection is noted. Instance this:

A sharp-eyed, anonymous Cincinnati clips the Carnegie-Illinois Steel Corporation's double-page ad on pages 8 and 9 of the Oct. 30 issue, headed, "Are these questions keeping you awake nights?" and showing a man in bed, gazing angrily at an alarm clock whose hands point to 1:43. "Why," inquires the Cincinnati, "shouldn't our friend be awake? His alarm clock is set for 12:15."

Of course, it might have been Sunday morning.



## Sunday Loaf

••• Speaking of Sunday mornings, Frank Oliver of the brains department suggests that as an historical note we record the fact that a manufacturer believes it necessary to report that his plant is not operated on the Sabbath.

The manufacturer in question, who has developed a new idea of interest to you, writes:

"... if you plan to visit our plant, please arrange to be here any day but Saturday or Sunday. We do not operate the plant on these two days."

## Thumbs Down On Reindeer

••• We don't blame Larry Bell, head of Bell Aircraft, for squawking over the English's intention of changing the name of the Airacobra to Caribou. Airacobra is graphic. Caribou would do as a name for a tank but no one except Santa Claus has been able to keep reindeer in the air for more than a second or so at a time.

The Bell blast, according to last reports has caused England to reconsider, and Airacobra it will probably be, there as well as here. We doubt that the English were very much set on Caribou in the first place, for they have always had a flair for picking exactly the right name for streets, cities, ships and planes. Spitfire, Hurricane, Tomahawk, Defiance and Beaufighter are but a few of their baptismal bull's-eyes. The only English plane name that we would give a D rating is the Buffalo, which is one of the least cerebral of the dumb beasts, and anatomically so constructed as to be

namesake to a slow, heavy tank than to an air fighter.

But we should not be too critical, for our own Navy has a new fighting ship that bears the pretty name of Curtiss XSB2C-1. Our best time so far on this tongue-twisting ragout of figures and letters is 2.3 seconds. The Navy will probably get around to rechristening it soon, but what scares us is that in the rush this little thing might be overlooked, and the plane's career might be blighted, like a helpless child named Cadwallader or Theodosia.

## "Junior" In Six Languages

••• You were electrified recently to learn here that the "jee" at the end of the common East Indian name Mookerjee simply means "son of," as also does the "escu" at the end of Lupescu.

Merritt A. Williamson pushes the ball along by telling us that these are known as patronymics, and that Fitzhugh is the son of Hugh, Macpherson is the son of Pherson, Petrovitch is the son of Peter, in Armenia the suffix "ian" means son of, and we wouldn't be surprised if these examples barely abrade the patronymic patina.

## Automotive Economy

••• "Well anyway, that girl on the Nash hood, with her three-point landing," wisecracks S. Fisher of American Car & Foundry's St. Louis plant, "at least saves the manufacturer the cost of a rear view mirror."

## Winged Words

••• Now and then the eye lights on a cluster of words that have fallen into a particularly graceful pattern. Take, for instance, this sentence in a recent editorial:

Every so often . . . some wise philosopher drops a pearl of wisdom so perfect that it becomes permanently mounted in man's diadem of memory.

"Mounted in man's diadem of memory" is caviar in print. For some reason or other a line in the New York Times' review of White Cargo, with Ann Corio, the famous stripteuse, in the leading role, sticks in our memory. It read, "... not for nothing had one silkworm labored twelve seconds to provide her with a costume."

Incidentally, we heard the other day that one of the Van Deventer editorials has been included in a book of essays that is required reading in some of the colleges, and are trying to find out which editorial it is. And R. E. Slayton, production manager of the Eclipse Machine Division, Bendix Aviation Corp., Elmira, N. Y., writes:

One of the first things I look for when IRON AGE comes to my desk is the page carrying your editorial by Mr. Van Deventer. I have enjoyed reading these so much from issue to issue that I am wondering if you have available a collection of them.

A couple of months ago we made up a booklet of 30 of them but the whole edition disappeared fast. We'll probably get out another collection soon.

## Puzzles

Last week's violator of the wages and hours act employed 19 men, 1 woman and 80 boys.

Alex M. Charlton of the Puget Sound Navy Yard had no trouble at all with the submarine problem, and the old guard, George N. Benoit, Lt. Com. Simpson, A. W. Kelly, and Robert T. Griffiths, went through the Oct. 30 mountaineer problem like a .22 through cellophane.

An answer to this in 30 minutes or less gets you a job in the War Department's intelligence section. The problem is to find the digits that are represented by letters:

ab ) cdeeb ( bfd  
ceb

gce  
gch

ceb  
ceb





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# This Industrial Week . . .

• • •

**I**N voting 9 to 2 against the compulsory closed shop in steel company owned coal mines, the National Defense Mediation Board this week took a step which might mark one of the war's turning points by preventing major strikes threatening the national defense program.

How strongly the administration is willing to stand behind the board's action, in which two A. F. of L. members joined four employer

## Surprise and Hope

representatives and three representatives of the public in preventing the forcing of the closed shop on the captive coal mines, remains to be seen. The decision, despite the danger to the defense program of any alternative, is filled with both surprise and hope. While John L. Lewis still may call a nation-wide strike, the results might not be happy for him.

Linked to the mediation board's decision is a long train of situations, one of these being in steel, where several weeks' calm is expected to end with the CIO convention Nov. 17 at Detroit. Demands for a steel wage increase and for the closed shop (the latter may be soft-pedaled in view of the mediation board's decision) are expected to be made following this convention, according to information given **THE IRON AGE**.

High in importance among the week's industrial events was the Office of Production Management's

## Memories of March, 1917

all-day meeting Tuesday with representatives of more than 200 companies representing the entire steel industry. The meeting recalled the famous March, 1917, gathering of the iron and steel section of the War Industries Board and executives of the steel industry.

To prepare the stage for this meeting, at which plans for revising the priority system of distributing steel to defense and non-defense plants were to be discussed, President Roosevelt said: "No greater call has ever been made on any industrial group than is required of the steel industry. The initiative, the energy and the re-

## No Greater Call Made

sourcefulness of every man in every capacity from the senior executives through every type of labor must concentrate upon these objectives, primary of which, of course, are the requirements of our Army, our Navy and our Maritime Commission.

"We must set aside any individualistic interest which interferes with this objective. The executives must, and I know they will, work with labor to meet this test of their resources, and I am equally as positive that labor will work with the executives, for that purpose is mutual—the protection of the lives and the homes of the American people and of every free home on earth."

President Roosevelt said he had watched with "personal interest"

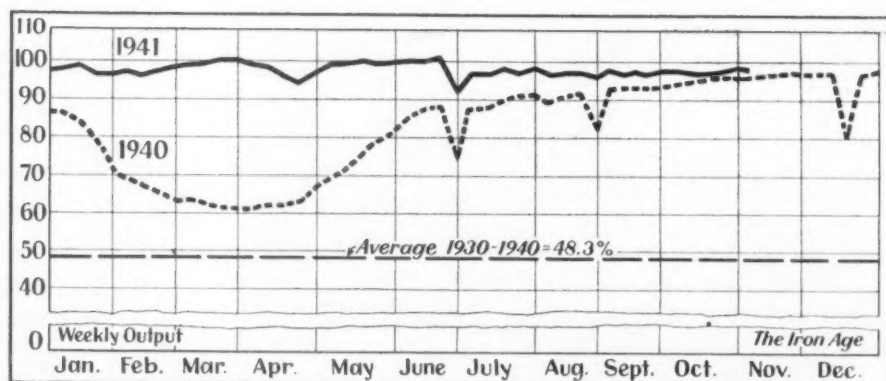
the part which the steel industry had played in the defense program. Less than 48 hours before, the steel industry in the U. S. heard Winston Churchill single it out for a comment that if steel is the base for war, Japan with a yearly capacity of 7 million tons could hardly hope to stand up against the U. S. with 90 million tons a year.

But the chief problem before the steel industry and the OPM was how to distribute the steel being made (U. S. Steel Corp. alone shipped a new high monthly total of 1,851,279 net tons in October compared with 1,572,408 tons in the like month of 1940), so that the defense plants obtain all they need and the non-defense plants get the remaining tonnage under a plan of fair distribution.

Early to get in its requirements for 1942 under the coming allocation system is the oil industry which, according to the office of Petroleum Administrator Ickes, will need 5,846,000 tons of steel "to carry on operations in 1942 on a scale calculated to meet all demands of the defense program." Largest single item in this total is 1,817,000 tons for tubular goods.

Steel ingot production for the

**Steel Ingot Production—Per Cent of Capacity**  
(Open Hearth, Bessemer and Electric Ingots)



**Steel Ingot Production, by Districts—Per Cent of Capacity**

	Pitts-	Chi-	Val-	Phila-	Cleve-	Buf-	Wheel-	De-	South-	S. Ohio	West-	St. Louis	East-	Aggre-
	burgh	cago	leys	delphia	land	falo	ing	troit	ern	River	ern	ern	ern	gate
Current Week . . . . .	99.0	102.0	95.0	90.5	98.0	92.5	94.0	109.0	95.5	97.0	95.0	111.0	109.0	97.51
Previous Week . . . . .	100.0	101.0	96.0	91.5	99.0	92.5	94.0	103.5	99.0	100.0	96.0	99.0	102.0	98.0



country is a half point lower this week to 97.5 per cent, the loss being

## Ingot Rate Off 1/2 Point

In Birmingham, Ala., repairs reduced the rate 3.5 points to 95.5 per cent. A one-point decline to 90.5 per cent in Eastern Pennsylvania was attributed to lack of scrap while lack of pig iron was a factor in a 3-point drop to 97 per cent in Southern Ohio. THE IRON AGE schedule of district steel operating rates also shows Pittsburgh down a point to 99 per cent, Chicago up a point to 102, Youngstown unchanged at 96. Buffalo unchanged at 92.5, Wheeling unchanged at 94, Detroit up 5.5 points to 109, and Pacific Coast unchanged at 96.

Using its broad authority to direct shipments, the OPM has been briskly manipulating iron and steel scrap supplies to keep defense production going. However, the OPM's carload diversions of this material, while permitting continuance of hand-to-mouth operations at plants hard pressed for scrap, do not reduce the overall shortage, and most major districts report the supply situation is growing still tighter. Collection drives have been vigorously renewed in many sections of the country, particularly farm areas.

While the steps being taken to revise the often-ineffective workings of the priority system in steel still are not yet clear to most plant managers, the fear of too-rapid changes in priorities has not disappeared.

## Fear of Rapid Change

An overnight change to a direct allocation system for steel, with the government scheduling production and deliveries, might result in a slowing down, rather than a speeding up, of the defense program.

Allocations made so far on a small scale have already disrupted steel mill schedules and in many instances some orders handed the mills by the Army and Navy should have been filled through other sources rather than through direct mill ordering. Even in the case of

OPM scheduling an allocation of steel plates, there might be instances where those responsible for changing rolling mill schedules will fail to realize the effects of their decisions all the way back to the semi-finished departments of the steel plant. Any attempt, therefore, to go into an all-out allocation method for all steel products without due regard for the factors involved in the primary and secondary production of steel might spell chaos. The advantages of a slow changeover from priorities to direct allocation are something that many in industry are thinking about. Despite the question of sharply-increased government control of industry and other issues involved, many business men favor a changeover to direct allocations where and when that is practicable.

How far the diversion of steel from the so-called civilian industries to defense industries has gone is shown in this issue of THE IRON AGE in a chart illustrating the distribution of steel by consuming industries. This chart represents

## Auto Makers In 8th Place

the distribution as recently as August of the finished products of steel companies with more than 80 per cent of U. S. capacity. The figures show roughly what the final breakdown of 1941 steel distribution will be. In August, for example, the automotive industry ranked eighth as a steel consumer against a ranking of first for all of 1940. It received 7.6 per cent of the finished steel shipped against 9.9 per cent for the first eight months of 1941, and 14.8 per cent in 1940. Evidently outbursts from its critics that the automobile industry is using up too much steel needed for national defense is on the way to being answered.

In contrast to the decline in automotive steel consumption, steel shipments to the shipbuilding industry rose from an average of 1.9 per cent for 1940, and 2.8 per cent in the first eight months of 1941, to 3.9 per cent in August.

Exports of steel have followed an erratic course, with 11.1 per cent going abroad in August, against an average of 9.3 per cent for the first eight months of 1941, a 16.7 per cent average in 1940

and a 6.4 per cent average in 1939.

British requirements for steel in the first half of 1942, covering semi-finished, are now expected to run to approximately 1,400,000 tons and allocation on this amount, more than half of which involves ingots and billets, is expected to be made soon. The British are expected to require, in addition to this tonnage, sheets, tin plate and other finished steel products in a volume which will lift total British steel requirements from the U. S. to near the level of the last half of 1941. Approximately 143,000 tons of shell steel, including 94,000 tons for lease-lend export, is being distributed to various steel companies and much larger tonnages are to be allocated in months to come.

Incoming steel orders are running 15 to 20 per cent below October, with non-defense customers dropping from the order books and new receivers of defense subcontracts adding to the industry's backlog. Representatives of the OPM are now checking shipments and orders of steel producers in the Cleveland and Youngstown districts against priority regulations, their visits in some plants being as long as three weeks.

Structural steel lettings jumped to 44,500 tons from 6900 tons last week and are the largest for any week since the first seven days of May. The outstanding award is 27,300 tons for four defense plants for the Aluminum Co. of America, which includes 8000 tons at Troutdale, Ore., 7300 tons at Bauxite, Ark., 6000 tons at Spokane, Wash., and 6000 tons at Los Angeles. Other substantial lettings are 8500 tons for a wind tunnel at Moffett Field, Cal., and 2700 tons for the Jacobs Aircraft plant at Pottstown, Pa.

## Structural Awards Rise

New structural steel projects of 17,425 tons are slightly lower than a week ago, with the largest job being 3500 tons for the Fort Peck Dam in Montana.

Reinforcing steel awards of 19,800 tons compare with 6750 tons last week and include 3050 tons for additional requirements for a dry dock at the Brooklyn Navy Yard and 1500 tons for a small arms plant for Remington Arms Co. at Remaco, Colo. New reinforcing projects total 6750 tons.

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# News of Industry

## Auto Industry Drops To 8th Among Steel Consuming Industries

• • • The slashing of civilian steel consumption to meet the demands of the defense program has reduced the automotive industry, in a little more than a year and a half, from the status of the largest individual consumer of steel in 1940 to the eighth largest in

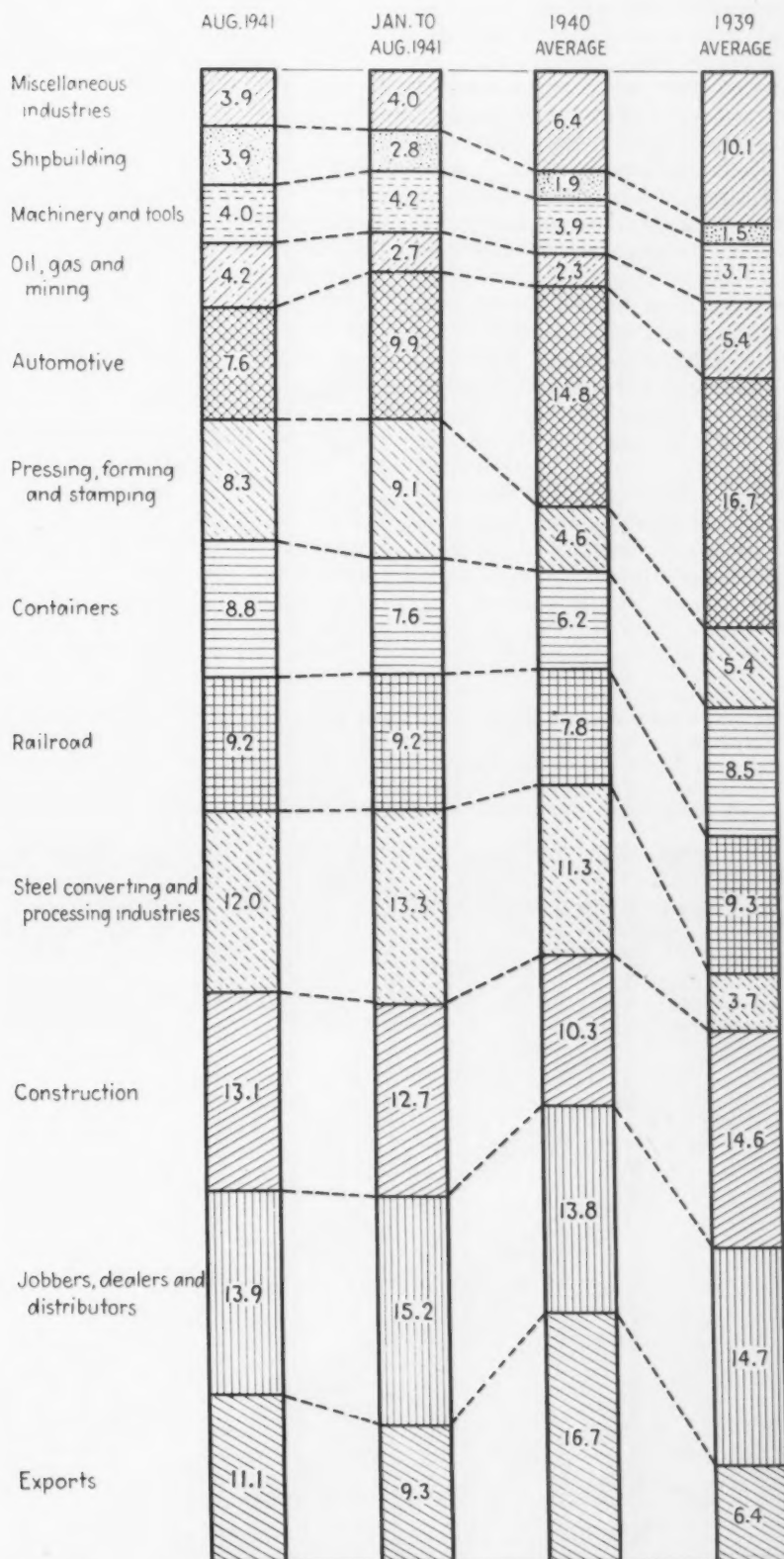
Based on reports from ten steel companies with approximately 83 per cent of the nation's capacity, the chart to the right shows roughly how the flow of steel to various consuming industries has varied in the last few years. Defense orders do not appear under that classification in the chart but figures substantially in the percentages for many of the industries. During August the automotive industry, ranked first in 1940, dropped to eighth.

August of this year, according to data recently made available showing the distribution of steel by consuming industries for as late as August of this year. Normally such information is available only once a year and shows distribution on a yearly basis.

In 1939 the automotive industry took 16.7 per cent of all steel tonnage shipped. In 1940, the first war year, this figure dropped to 14.8 per cent. By August of the present year, when curtailment of automobile output began in earnest, shipments to the industry rep-

### DISTRIBUTION OF STEEL BY CONSUMING INDUSTRIES

(FIGURES IN SQUARES INDICATE PER-CENT OF OUTPUT)



Sources: American Iron & Steel Institute  
Department of Commerce

The Iron Age

resented only 7.6 per cent of all steel shipments, with the average for the period from January through August of the present year being 9.9 per cent.

Contrasted with the decline, consumption of steel in the shipbuilding industry rose from 1.9 per cent in 1939 to 3.9 per cent in August of this year. While the proportion of steel going into construction work (13.1 per cent) is currently slightly below the 1939 rate of 14.6 per cent, it is substantially above the 1940 total of 10.3 per cent.

Exports have been following an erratic course, amounting to 6.4 per cent in 1939, or before the war, and rising to 16.7 per cent in 1940, as the war spread. Now with all exports from this country under rigid control, this figure has shrunk to 11.1 per cent for August and averaged 9.3 per cent for the first eight months of 1941.

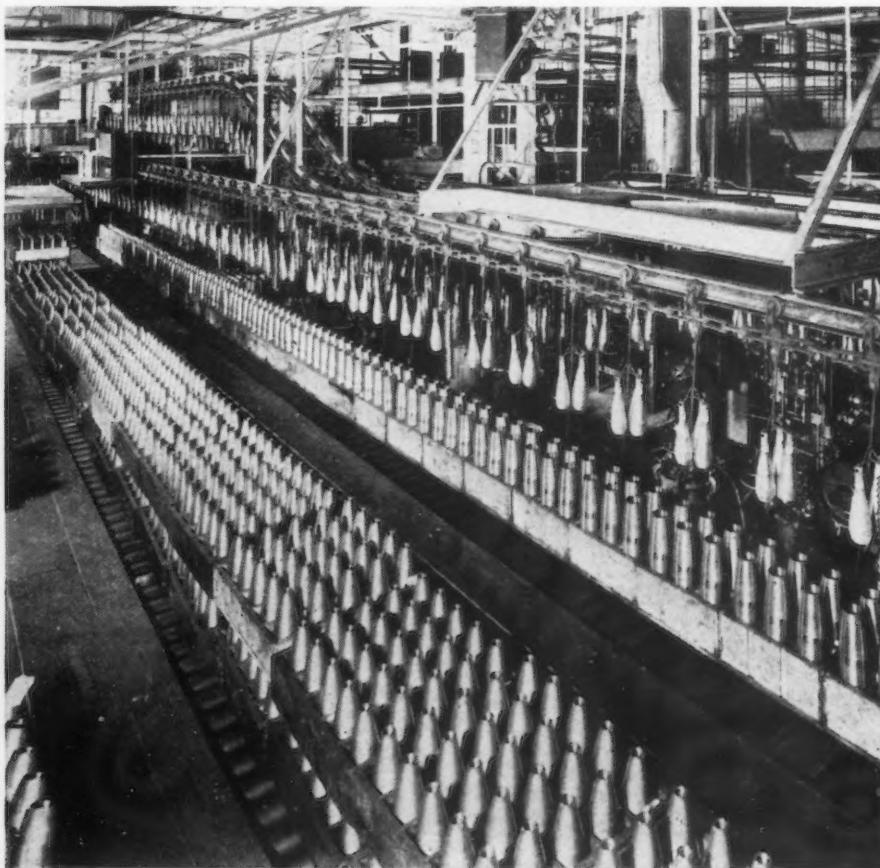
Shipments of steel to jobbers,

dealers and distributors have been following a comparatively even pace, amounting to 14.7 per cent in 1939, 13.8 per cent in 1940, 15.2 per cent for the first eight months of 1941 and 13.9 per cent for the month of August only.

The tonnages represented by these shipments (which cover ten companies with more than 80% of U. S. capacity) was not disclosed, but the production for sale of finished and rolled steel in August amounted to 5,573,666 tons, while shipments to all industries in 1940, according to the American Iron & Steel Institute was 48,850,825 tons and in 1939 32,353,300 tons, according to THE IRON AGE tabulations.

The data used in compiling the accompanying graph were compiled by the Department of Commerce. The department in turn used statistics collected by the American Iron and Steel Institute and THE IRON AGE.

**SHELL GAME:** The old shell game takes on deadly seriousness as the U. S. girds for all-out defense. Typical of this all-out effort is the shell division of Budd Wheel Co., Detroit, shown here, which a short time ago was busy making automobile hubs, brake drums and other auto parts but is now playing an important role in the defense program.



## October Construction Awards Down 21%

••• Engineering construction awards for the month of October totaled \$406,332,000, down 37 per cent from average for the four weeks of September and 42 per cent from October, 1940. The decline in volume of federal work, 56 per cent below a month ago and 42 per cent under a year ago, is the chief reason for the decrease, according to the *Engineering News-Record*.

Private construction is 3.5 per cent higher than a month ago, and public construction during October, reflecting the decrease in federal work, is 43.5 per cent lower than during September. State and municipal construction awards top September values by 14 per cent.

Private construction during October amounted to \$94,760,000; and state and municipal construction, \$311,572,000.

The October dollar value of new construction brings the 1941 volume for the ten-month period to \$5,250,210,000, a 64 per cent increase over the corresponding ten months of 1940. New construction financing for the current year, to date, totals \$6,089,206,000, exceeding the total for the 10 months last year by 72 per cent.

## Farm Equipment Firms Hold Large Contracts

Chicago

••• Member firms of the Farm Equipment Institute have received defense contracts amounting to \$126,000,000 of total contracts administered by the Chicago ordinance district, which is equivalent to 37 per cent.

Allis-Chalmers is producing anti-aircraft gun mounts and many other defense parts which total about \$8,000,000 in ordnance contracts alone. J. I. Case Co. is also making 155 mm. shells to the tune of \$4,700,000. Both Deere & Co. and Caterpillar Tractor have contracts, each in excess of \$20,000,000 for transmissions for the 28-ton tank. International Harvester has about \$25,000,000 in ordnance contracts. Minneapolis-Moline Power Implement Co. is now working on a new \$3,600,000 order for 155 mm. shells. Oliver Farm Equipment Co. is making shells. Trackson Co. is producing \$1,250,000 of machine gun mounts.



## SPAB Pools to Aid Small Business

••• A program to keep small manufacturers in business during the emergency defense program was proposed this week by the Priorities Division of the SPAB, calling for the allocation to small producers of vital material from "pools" that will be set up for various materials. Stored by producers, these "pools" of materials will be used only to meet hardship cases of small concerns that would be forced out of business for lack of such supplies.

After the amount of a material required for vital defense work has been determined, allocations will be set up on the basis of pro-rata distribution of the remainder, probably based on consumption by the manufacturer during a pre-war period. In addition, however, each producer will be asked to set aside a specific part of his production, probably about 5 per cent, to

be held as a government pool. When a particular manufacturer can show that he is threatened with extinction or extreme difficulty by lack of material, the government will issue a special order on the pool, supplying the manufacturer with required material.

These new material pools will probably work in much the same manner as the pools that are now in operation, calling for monthly stocks of pig iron, slab zinc, zinc oxide, and lead to be held by the producers. While these pools are primarily for defense emergencies, supplying manufacturers of defense items with materials that are urgently needed, the machinery used to set them into operation will in all probability be utilized.

The amount of metal set aside since the defense pools were set up is shown in the accompanying table, along with the OPM orders of pooling and the date they were issued.

## Carboloy Reports Big Rise In Steel Cutting Grades

*Detroit*

••• Figures on nine months' sales just released by the Carboloy Co., Inc., indicate that for this period production of carbide tool grades designed for steel cutting soared 522 per cent over the same period last year, while total carbide production has been boosted by defense demands to some 278 per cent over the nine months of 1940. Figures are exclusive of shipments of carbide materials to the British Empire.

In announcing the figures, W. G. Robbins, Carboloy president, said: "Every additional carbide tool used by defense industry not only means an average output increase of at least 25 per cent machine per hour on which the tool is used, but also means an important saving in tungsten. Figures show that every pound of tungsten used in carbide tipped tools replaces 100 lb. of tungsten required by other forms of tools."

## Government Defense Metal Pools

Date:	4,856,306 Metal:	Pool Terms:	Metal Pooled: Net Tons	Order:
March 7	Slab Zinc	April Pool: 5 per cent April Production	3,500	OPM order
April 18	Slab Zinc	May Pool: 17 per cent May Production	12,500	OPM order
June 11	Slab Zinc Zinc Oxide Zinc Dust	Placed under full Priority Control as of July 1. General Preference Order, M-11		M-11
June 20	Slab Zinc Zinc Oxide	July Pool: 22 per cent May Production July Pool: 10 per cent May Production	16,000	M-11-a M-11-a
July 30	Slab Zinc Zinc Oxide	August Pool: 27 per cent June Production August Pool: 10 per cent June Production	19,000	M-11-b M-11-b
Aug. 22	Slab Zinc Zinc Oxide	September Pool: 27 per cent July Production September Pool: 10 per cent July Production	20,000	M-11-c M-11-c
Sept. 24	Slab Zinc	October Pool: 27 per cent August Production	20,400	M-11-d
Oct. 29	Slab Zinc Zinc Oxide	November Pool: 31 per cent of August Production November Pool: 10 per cent of August Production	23,412	M-11-e M-11-e
Aug. 1	Pig Iron	Placed under full Priority Control as of Aug. 1. General Preference Order M-17		M-17
Aug. 14	Pig Iron	September Pool: 2 per cent of September Production	900,000	M-17
	Pig Iron	October Pool: 2 per cent of October Production	970,000	
	Pig Iron	November Pool: 2 per cent of November Production		
Oct. 4	Lead	Placed under full Priority Control as of Nov. 1. General Preference Order, M-38		M-38
Oct. 22	Lead	November Pool: 15 per cent of November Production	6,000	M-38

## Special Trains Out to Find Subcontractors

Washington

••• Three Defense Special Trains, manned by Army, Navy, Marine Corps, Maritime Commission and Division of Contract Distribution representatives and loaded with "bits and pieces" and samples of needed defense articles, left Washington Monday on a tour of the country.

These trains will give small manufacturers the facts about defense contracts and advice on contract and sub-contract procurement procedure. Invitations are being sent manufacturers throughout the country to visit these trains and see what needed parts

can be made in their plants with existing manufacturing facilities.

Admission is by tickets, which can be obtained from local offices of the Division of Contract Distribution. Manufacturers, suppliers, and sub-contractors interested in manufacturing or supplying defense items or obtaining defense sub-contracts are urged to attend, bringing with them a complete list of their productive facilities.

### Kansas City

••• Civilian consumption requiring the same raw materials as the defense program cannot cease, but a balance must be struck as to

how much "shall be used for the sword of defense and how much for the plowshare," Floyd B. Odlum said Nov. 6 at a Defense Conference in Kansas City. Factories must be kept at work to be preserved for normal work in the future, he said.

In the first phases of the defense program, about 75 per cent of the orders for defense goods were placed with a few large producers because their ability to deliver was well known, Odlum said. He pointed out that the War Department alone today is dealing with about 15,000 different enter-

prises as prime contractors. Of the estimated 185,000 manufacturers in United States, the number that can be converted to defense work is unknown but at least 40,000 in the metal working industry can be aided, he said.

The work of the Contract Distribution Division is not to buy or place orders for anything, but to determine from the services doing the purchasing what they will need and to find idle or prospectively idle plants and machine tools to make what will be needed. The manufacturing clinics have helped in this work considerably, bringing together defense contractors and prospective sub-contractors. A number of these clinics have been held throughout the country, and as many as 1500 sub-contracts have been written as a result of a single clinic.

### Priorities Clinic at Buffalo on Nov. 28

Buffalo

••• An all-day "priorities clinic" to answer questions of manufacturers with prime contracts and subcontractors will be held here Nov. 28 under direction of the Priorities Field Service of the OPM.

"We are not sitting here like a policeman with a club ready to hit these manufacturers over the head," said Paul R. Smith, district manager of the service. "We merely play the role of a physician anxious to prescribe a remedy for an ailing patient."

### Big Milwaukee Firms Subletting Generously

Milwaukee

••• Prominent prime defense contractors here are doing a good job of farming out their work to firms in their immediate territory. It is estimated that close to \$80,000,000 of subcontracting has been released in this area, though much of it has come from districts outside of the Milwaukee circle.

Kearney & Trecker is reported to be subletting between 20 and 30 per cent of total production. Allis-

## SCHEDULE OF DEFENSE SPECIALS

TRAIN 1	TRAIN 2	TRAIN 3
<b>November</b>	<b>November</b>	<b>November</b>
11 Tue. Wilmington, Del.	11 Tue. Pittsburgh, Pa.	12 Wed. Denver, Colo.
12 Wed. Trenton, N. J.	12 Wed. Pittsburgh, Pa.	13 Thu. Denver, Colo.
13 Thu. Bridgeport, Conn.	13 Thu. Buffalo, N. Y.	15 Sat. Billings, Mont.
14 Fri. Bridgeport, Conn.	14 Fri. Buffalo, N. Y.	17 Mon. Salt Lake City, Utah
15 Sat. Providence, R. I.	15 Sat. Erie, Pa.	18 Tue. Boise, Idaho
17 Mon. Lynn, Mass.	17 Mon. Akron, Ohio	19 Wed. Spokane, Wash.
18 Tue. Portland, Maine	18 Tue. Akron, Ohio	21 Fri. Seattle, Wash.
19 Wed. Bangor, Maine	19 Wed. Youngstown, Ohio	22 Sat. Seattle, Wash.
20 Thu. Berlin, N. H.	21 Fri. Toledo, Ohio	24 Mon. Portland, Oreg.
21 Fri. Rutland, Vt.	22 Sat. Lansing, Mich.	26 Wed. Sacramento, Calif.
22 Sat. Worcester, Mass.	24 Mon. Muskegon, Mich.	27 Thu. San Diego, Calif.*
24 Mon. Worcester, Mass.	25 Tue. South Bend, Ind.	28 Fri. San Diego, Calif.
25 Tue. Springfield, Mass.	26 Wed. Milwaukee, Wis.	29 Sat. Phoenix, Ariz.
26 Wed. Springfield, Mass.	27 Thu. Milwaukee, Wis.	* Noon.
28 Fri. Waterbury, Conn.	28 Fri. Madison, Wis.	
29 Sat. Poughkeepsie, N. Y.	29 Sat. Minneapolis, Minn.	
<b>December</b>	<b>December</b>	<b>December</b>
1 Mon. Albany, N. Y.	1 Mon. Minneapolis, Minn.	1 Mon. El Paso, Tex.
2 Tue. Utica, N. Y.	2 Tue. Rock Island, Ill.	3 Wed. San Antonio, Tex.
3 Wed. Syracuse, N. Y.	3 Wed. Rock Island, Ill.	4 Thu. Houston, Tex.
4 Thu. Binghamton, N. Y.	4 Thu. Des Moines, Iowa	5 Fri. Dallas, Tex.
5 Fri. Scranton, Pa.	5 Fri. Omaha, Nebr.	6 Sat. Oklahoma City, Okla.
6 Sat. Reading, Pa.	6 Sat. Springfield, Mo.	8 Mon. Little Rock, Ark.
8 Mon. Harrisburg, Pa.	8 Mon. Springfield, Mo.	9 Tue. Memphis, Tenn.
9 Tue. Greensboro, N. C.	9 Tue. Joliet, Ill.	10 Wed. Jackson, Miss.
10 Wed. Charlotte, N. C.	10 Wed. Indianapolis, Ind.	11 Thu. New Orleans, La.
11 Thu. Greenville, S. C.	11 Thu. Indianapolis, Ind.	12 Fri. New Orleans, La.
12 Fri. Atlanta, Ga.	12 Fri. Evansville, Ind.	13 Sat. Mobile, Ala.
13 Sat. Macon, Ga.	13 Sat. Louisville, Ky.	15 Mon. Birmingham, Ala.
15 Mon. Tampa, Fla.	15 Mon. Cincinnati, Ohio	16 Tue. Nashville, Tenn.
16 Tue. Jacksonville, Fla.	16 Tue. Cincinnati, Ohio	17 Wed. Chattanooga, Tenn.
17 Wed. Columbia, S. C.	17 Wed. Columbus, Ohio	18 Thu. Knoxville, Tenn.
18 Thu. Raleigh, N. C.	18 Thu. Charleston, W. Va.	
19 Fri. Richmond, Va.	19 Fri. Lynchburg, Va.	

TICKETS LIKE THIS (right) necessary for manufacturers desiring to visit the three 8-car defense contract special trains now touring the country, may be obtained at the OPM Division of Contract Distribution offices in cities to be visited. The schedule (above) shows the cities to be visited.

12:00 PM

12:30 PM

1:00 PM

1:30 PM

2:00 PM

2:30 PM

3:00 PM

3:30 PM

4:00 PM

4:30 PM

5:00 PM

11:30 AM

11:00 AM

10:30 AM

10:00 AM

9:30 AM

9:00 AM

RETAIN  
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NOV 12 1941

DEFENSE  
SPECIAL

This card admits representative  
of \_\_\_\_\_  
to the DEFENSE SPECIAL  
at the time indicated

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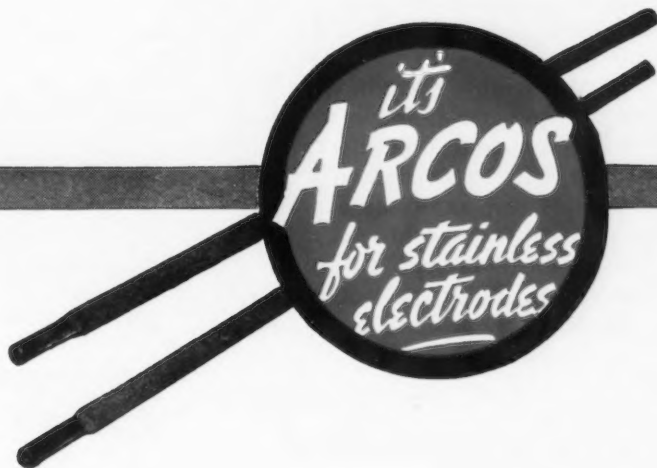




## STAINLESS ELECTRODE WELDING PROCEDURE!

Just off the Press! Arcos Technical Bulletin No. 5. Here is new, concise information in easy-to-use form —including illustrated procedure for welding air hardening steels with Arcos Stainless Electrodes. Write today for your copy.

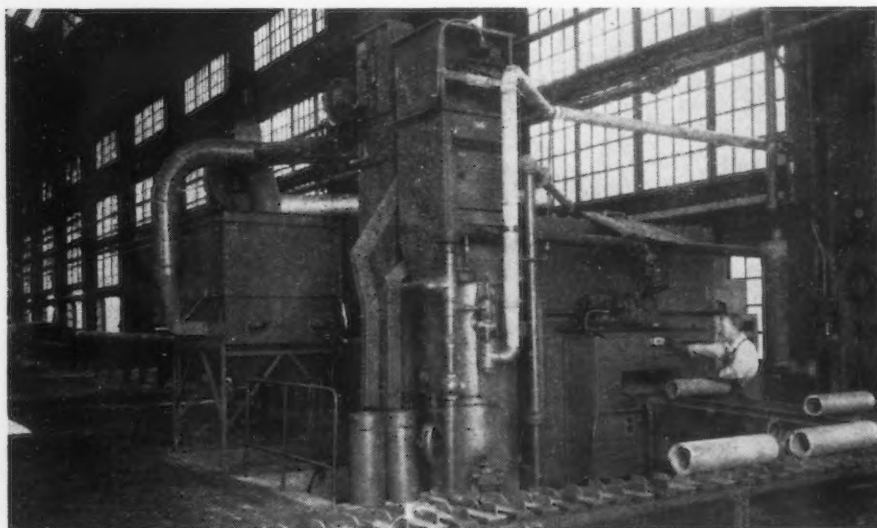
**ARCOS CORPORATION**  
401 N. Broad St., Phila., Pa.



**"QUALITY WELD METAL EASILY DEPOSITED"**

### Distributors Warehouse Stocks in the Following Cities:

ATLANTA, GA. . . . .	J. M. Tull Metal & Supply Co.	KINGSFORT, TENN. . . . .	Slip-Not Belting Corp.
BUFFALO, N. Y. . . . .	Root, Neal & Co.	LOS ANGELES, CALIF. . . . .	Ducommun Metals & Supply Co.
BORGER, TEXAS . . . . .	Hart Industrial Supply Co.	MILWAUKEE, WIS. . . . .	Machinery & Welder Corp.
BOSTON, MASS. (Belmont) . . . . .	H. Boker & Co., Inc.; W. E. Fluke	MOLINE, ILL. . . . .	Machinery & Welder Corp.
CHICAGO, ILL. . . . .	Machinery & Welder Corp.	NEW YORK, N. Y. . . . .	H. Boker & Co., Inc.
CINCINNATI, OHIO . . . . .	Williams & Co., Inc.	OKLAHOMA CITY, OKLA. . . . .	Hart Industrial Supply Co.
CLEVELAND, OHIO . . . . .	Williams & Co., Inc.	PAMPA, TEXAS . . . . .	Hart Industrial Supply Co.
COLUMBUS, OHIO . . . . .	Williams & Co., Inc.	PITTSBURGH, PA. . . . .	Williams & Co., Inc.
DETROIT, MICHIGAN . . . . .	C. E. Phillips & Co., Inc.	PORTLAND, OREGON . . . . .	Industrial Specialties Co.
ERIE, PENNA. . . . .	Boyd Welding Co.	ROCHESTER, N. Y. . . . .	Welding Supply Co.
FT. WAYNE, IND. . . . .	Wayne Welding Supply Co., Inc.	SAN FRANCISCO, CALIF. . . . .	Ducommun Metals & Supply Co.
HONOLULU, HAWAII . . . . .	Hawaiian Gas Products, Ltd.	SEATTLE, WASH. . . . .	H. A. Cheever Co.
HOUSTON, TEXAS . . . . .	Champion Rivet Co. of Texas	ST. LOUIS, MO. . . . .	Machinery & Welder Corp.
KANSAS CITY, MO. . . . .	Welders Supply & Repair Co.	SYRACUSE, N. Y. . . . .	Welding Supply Co.
		TOLEDO, OHIO . . . . .	Williams & Co., Inc.



**CLEAN SHELLS:** Cleaning scale, sand and dirt from the exterior and interior of shells is a vital part of shell manufacturing operations. An automatic cleaning installation by the Pangborn Corp. at the Baldwin Locomotive Works, is shown here handling 155 mm. shells. All operations of this blast cleaner are automatic and, as the photograph shows, fit efficiently into the conveyORIZED production line.

Chalmers is giving work to more than 200 plants. The Oilgear Co. is subcontracting about 30 per cent of its business and is using about 40 different plants, the smallest of which employs three men, the largest about 5,000. A. O. Smith is reported to be using about 40 subcontractors, mostly in this section. About 10 per cent of Filer & Stowell defense orders have been spread around. The majority of 60 firms working for Nordberg Mfg. Co. are located here. Falk Corp. is using about 15 plants and is looking for more. Cutler-Hammer has given jobs to about 45 plants, which can handle screw machine, milling machine and sheet metal work.

#### New Book Issued on Modern Strip Mills

• • • The Association of Iron and Steel Engineers has published a volume entitled "The Modern Strip Mill," containing 512 pages, with 62 tables and 227 illustrations. It is being distributed free to the members of the Association. Additional copies are available for sale to those interested.

The book is divided into two parts. Strip mill design and practice are described in the first part, which is divided into 9 sections. In the second part, available data on 28 individual installations have been tabulated.

#### 51 Small Plants Join For Defense Production

Chicago

• • • Fifty-one small plants here organized into the Chicago Defense Association, have obtained an option for over 500,000 sq. ft. of floor space to be used as the main assembly plant in the group's drive to get defense contracts. Personnel and supervisors of the plant will be furnished by members of the association. Member plants will fabricate the parts in their own plants. The group believes it will obtain government funds for purchase of the central floor space.

#### Mayari Pig Iron Shortage Reported by Eastern Buyers

Philadelphia

• • • Eastern consumers report a shortage of Silvery and Standard Mayari pig iron, the high silicon iron made by Bethlehem Steel Corp. Used chiefly in the manufacture of high pressure vessels, this iron has not been placed under OPM control, but control of blast furnace output restricts its manufacture. Both Silvery and Standard Mayari iron are made from Cuban ores, with the silicon in the Silvery grade running close to 8.5 per cent.

#### Trecker Foresees Widespread Closings

Milwaukee

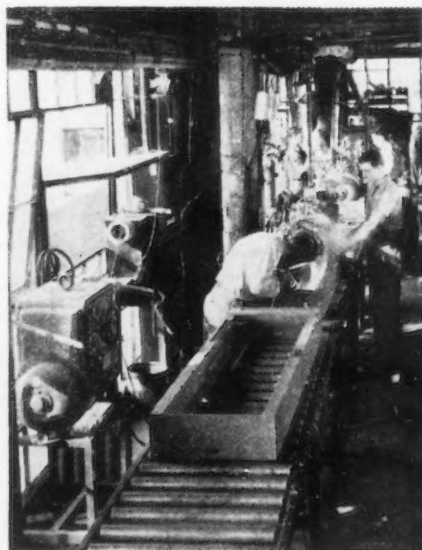
• • • Over 30,000 firms may be out of business before the defense program is over, Joseph Trecker, head of subcontracting for OPM and vice-president of the Kearney & Trecker Co., told 500 industrial leaders here. Trecker warned that the only salvation of most companies was conversion to defense business and that many companies would just have to get out and "dig" to get in the defense program.

#### Monarch Wins "E" Flag

Sidney, Ohio

• • • Monarch Machine Tool Co. here was awarded on Nov. 11 the U. S. Navy Bureau of Ordnance Flag and the Navy "E" Pennant, presented by the Navy for outstanding effort in the production of ordnance materials for the Navy. The presentation was made by Admiral William Harrison Standley within the Monarch plant with the 1500 men on both the day and night shifts attending.

**TO SPEED PRODUCTION:** Hobart Brothers Co., Troy, Ohio, places welding machines at strategic points along the assembly lines to eliminate backward handling from assembly line to welding shop. By utilizing welding equipment with the "straight line" method of assembly, parts may be added at various stages of assembly where they do not interfere with previous fabricating or assembling operations.







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STEELS

THE **WILL**

TO MAKE GOOD STEEL

Making the kind of steel you want boils down to having a knowledge of the customer's steel requirements, an organization of skilled steelmakers, the best of steel-making equipment, and — above all — the **WILL** to make good steel.

**"SPECIAL QUALITY"** TOOL AND ELECTRIC FURNACE ALLOY STEELS

*CARBON TOOL STEELS*

*ALLOY TOOL STEELS*

*STAINLESS STEELS*

*NITRALLOY STEELS*

*AIRCRAFT QUALITY STEELS*

*BEARING QUALITY STEELS*

**ARISTOLOY STEELS**

**COPPERWELD STEEL COMPANY · WARREN, OHIO**



*British-Combine*

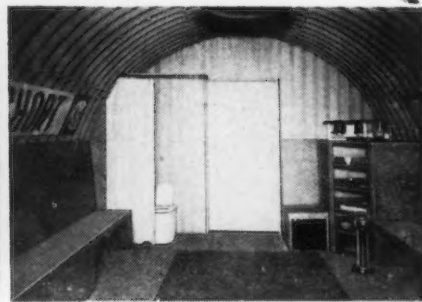
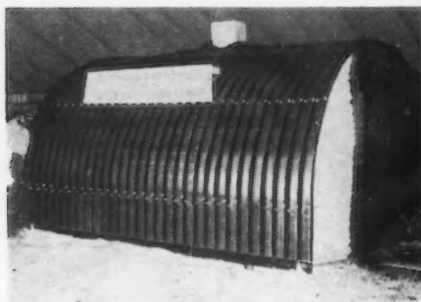
**BLENHEIM BOMBERS:** On the Bristol Blenheim bombers shown here in flight is falling the chief burden of carrying the war to Germany.

o o o



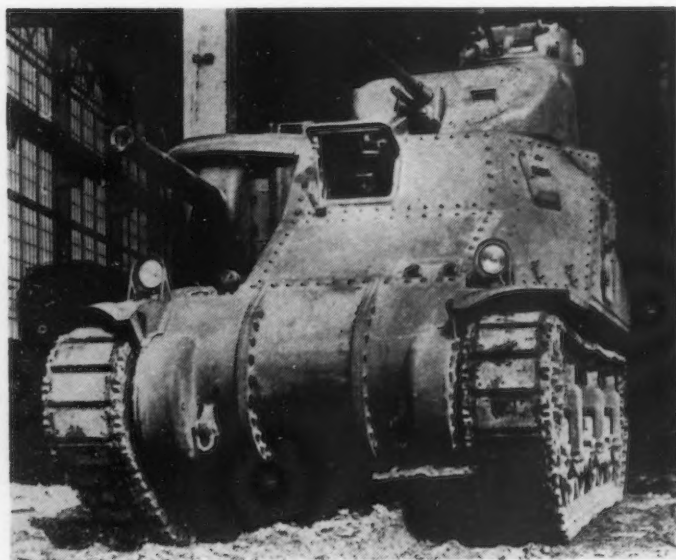
*International News*

**BATTLE STATIONS:** Crew of this U. S. submarine "somewhere in the Atlantic," takes battle stations in maneuvers to back up President Roosevelt's Navy Day pledge to defeat Hitlerism. The deck gun is at "the ready" position.



**AIR RAID SHELTER, 1942 MODEL:** The latest design in bomb shelters is an air-conditioned, steel model developed by Airtemp Division of Chrysler Corp. Many conveniences of a modern home are incorporated in its design, including a stove, dish cupboard and dishes, water cooler, and sanitary facilities, as well as safety devices such as a fire extinguisher, spade and other digging tools.

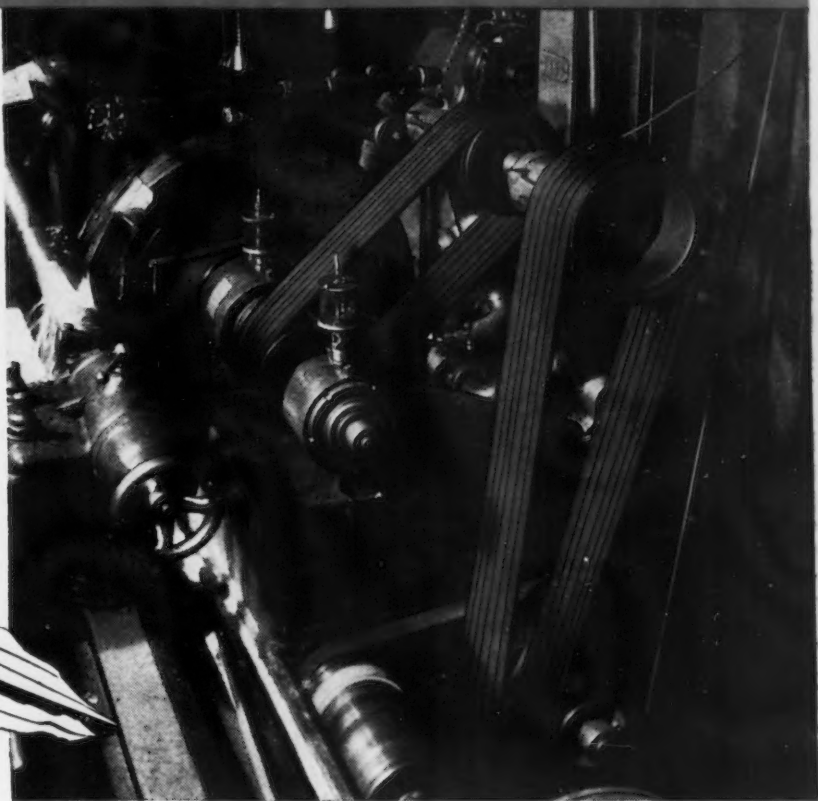
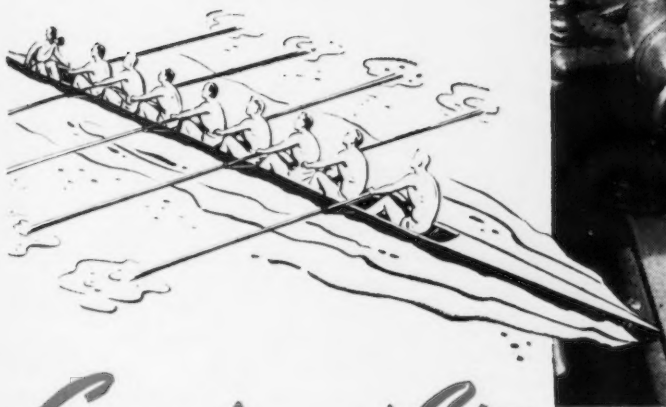
**BLITZ TANKS:** These American tanks may show Hitler how to put some "blitz" in "blitzkrieg." The 29-ton tank, left, manned by a crew of seven, is powered by a 400 hp. airplane engine, has five forward and one reverse speeds and mounts a 75 mm. cannon. Powered by a 250-hp. airplane engine, the 13-ton tank on the right is manned by a crew of four. Chrysler Corp. is making the 29-ton tank, and American Car & Foundry Co., turned out its 2000th 13-ton tank on Oct. 21.





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OF DODGE "D-V"  
DRIVES GIVES YOU**



*Speed and Stamina . . .* **FOR TODAY'S  
PEAK DEMAND OR TOMORROW'S NORMAL NEEDS**

Now . . . when industry is straining to get peak production . . . Dodge "D-V" Drives are proving their mettle. They match the speed of the hour — but in addition, provide a reserve of ruggedness which means less maintenance not only now, but for the day when the pace of production again returns to normal.

Put Dodge "D-V" Drives on your production machines now — Their "Matched Quality" means properly designed and accurately built sheaves with the required number of V-Belts

selected because of their suitability for power transmission service.

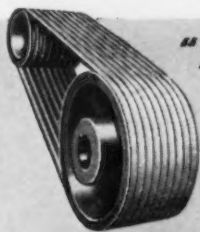
Dodge "D-V" Sheaves are carefully machined — groove diameters are uniform — each belt pulls its full load — no loafing belts — "D-V" Belts have concave side walls so that the sides provide a perfectly straight surface in contact with the grooves.

Try Dodge "D-V" Drives — they give you Double Value.

**DODGE MANUFACTURING CORPORATION**  
MISHAWAKA, INDIANA, U.S.A.

**DODGE "D-V" DRIVES OFFER**

- Constant speed ratios easily maintained at all speeds.
- Transmits full power — no loss through slippage.
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*"Matched Quality" FEATURES*

- Complete modern power transmitting unit backed by one responsibility.
- Sheaves are carefully machined — groove diameters are uniform.
- Dodge "D-V" Drives are clean and noiseless — requiring no lubrication of any kind — consequently damage to work due to oil leakage or throwing of lubricant is eliminated.



**THE RIGHT DRIVE**

**FOR EVERY JOB**

## QMC Now Permits Many Substitutes

Washington

••• In its efforts to cut down the use of strategic and critical materials formerly used in the many articles of supplies and equipment it procures for the Army, the Quartermaster Corps is developing as many substitutes as possible, the War Department has announced.

In many items, tentative specifications have been established which permit contracting officers to accept them in whole or in part if the substitutes will be suitable.

For example, canvas field bags have as component parts, buckles, snaps and rings which were formerly made of solid bronze metal with bronze finish. Four substitutes have now been made available for these items: malleable iron or stamped steel, parkerized finish; the same materials with black baked enamel finish or with black japan finish; and malleable

iron, brass plated, oxidized finish.

To date, malleable iron and steel have been substituted in 96 items of equipment procured in large quantities by the Quartermaster Corps for the Army. In place of nickel, the Corps has turned to wood, vitrified clay, cast iron, galvanized iron, steel and glass. These substitute materials receive a special finish to make them suitable for use in all sorts of table tops used in Army kitchens and hospital laboratories, in electric fixtures, kettles and many other items.

Zinc has been replaced by substitutes in the method of galvanizing and copper has given way to such materials as porcelain, glass and corrosive resisting steel. Cooking utensils and many other common items made of aluminum are no longer purchased by the Quartermaster Corps. In the case of cooking utensils, enamelware and steel are being used.

Plastics are being developed rapidly and many new uses are being found for them in the Army procurement program. Such di-

verse items as salt and pepper shaker tops and uniform buttons are possible future uses. Fibre glass and rock cork are being substituted for cork in many instances. Wood and concrete are replacing steel in construction specifications wherever possible. In 17 Army items of supply containing silk, substitutes have been found for 14 of them.

## Monsanto Seeks Substitute For Tin in Tin Plate Making

••• Important savings in tin consumption through development of methods of phosphate treating rolled strip steel for cans are foreseen as the result of a research program disclosed recently by Dr. Russell L. Jenkins, research director of Monsanto Chemical Co.'s phosphate division. Dr. Jenkins pointed out that the use of organic coatings in recent years have found increasing use for coating the insides of cans. Despite the development of these coatings, he said, it is still necessary to tin plate the base steel, or in the case of non-food products, to plate it with terne to prevent rusting between the time the steel is made and its fabrication into cans.

The research program Monsanto is initiating was described as looking to the application of a phosphoric acid or phosphate treatment to rolled strip. "The work has been undertaken," according to Dr. Jenkins, "to develop a process which would make the use of tin unnecessary."

## Cut in Supply Faces Some Tin Plate Users

Chicago

••• Users of tin cans other than the preserved foods manufacturers will have to get along with reduced supplies, Arthur V. Crary, vice-president of Continental Can Co., said here. Not only unprecedented demand for tin plate in the food industries but vast supplies of tin plate going to export on order of the OPM have brought the shortage which will be felt keenly from now on. The amount of tin coating is being reduced and greater use of lacquered steel plate and terne plate has been forced upon the industry.

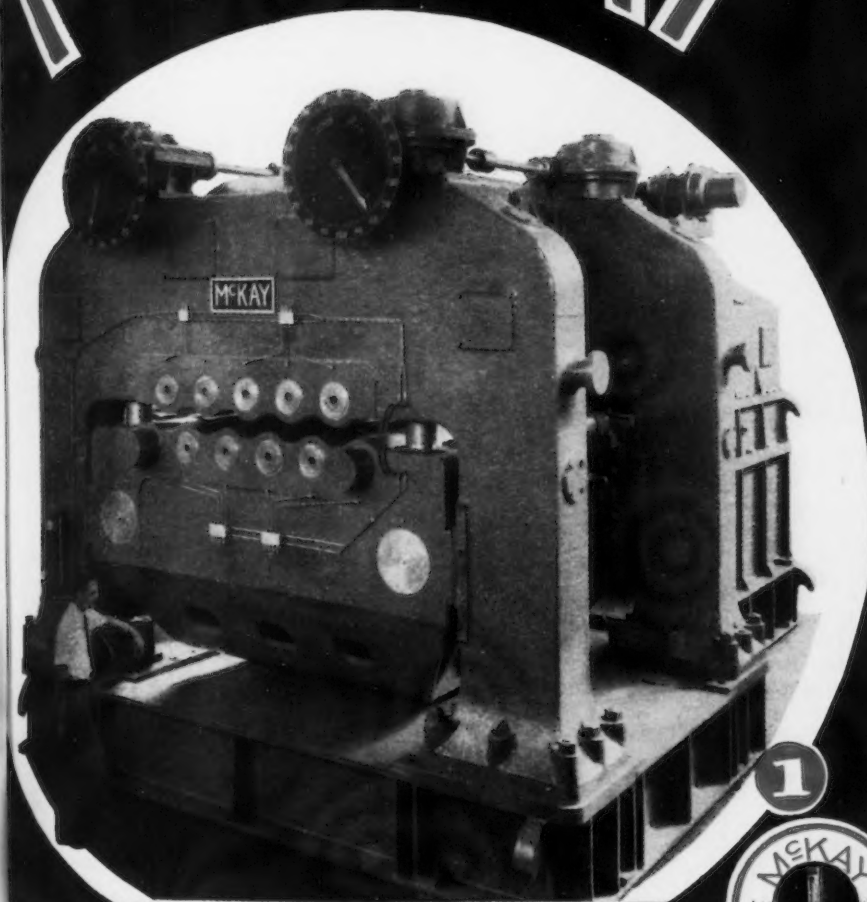
**A STRATOLINER "WEIGHS IN":** The weighing of the Stratoliner Quintuplets, largest transport plane in domestic air line service, is required annually by Uncle Sam. It took a crew of 20 about 800 hr. to weigh this 31,200 lb. plane. Two sets of 15,000 lb. scales were placed under each wheel and another set was suspended from the hangar roof by two Wright High Speed Trolley Hoists and attached to the tail which was lifted to flying position.



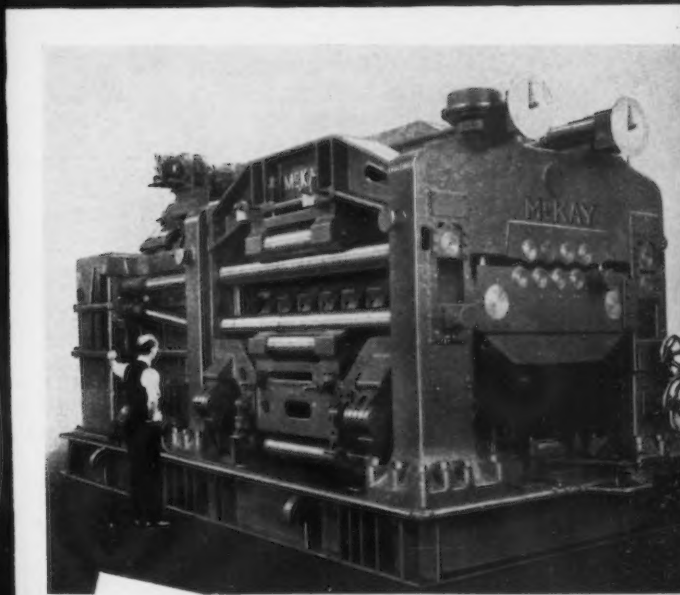


# McKAY

1. The McKay Heavy Duty Roller Leveller.
2. The Budd-McKay Processing Machine.
3. McKay Heavy Duty Backed-up 4-Hi Plate Leveller.
4. Backed-up Roller Leveller.



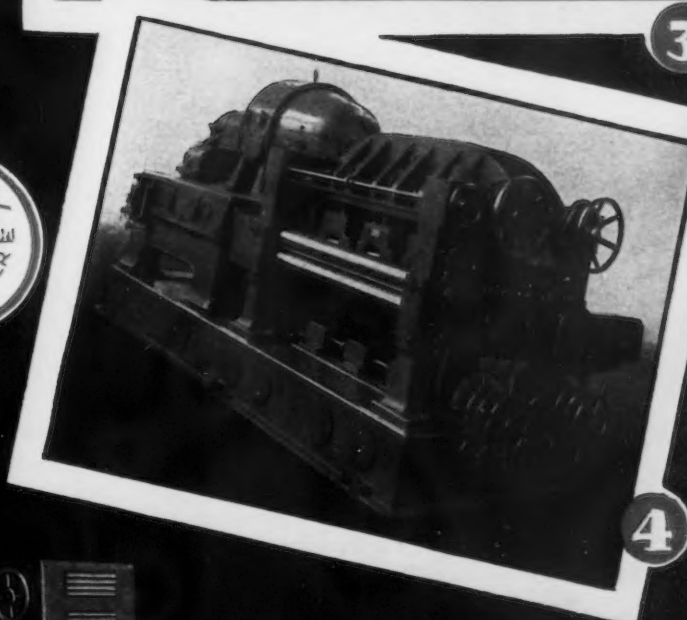
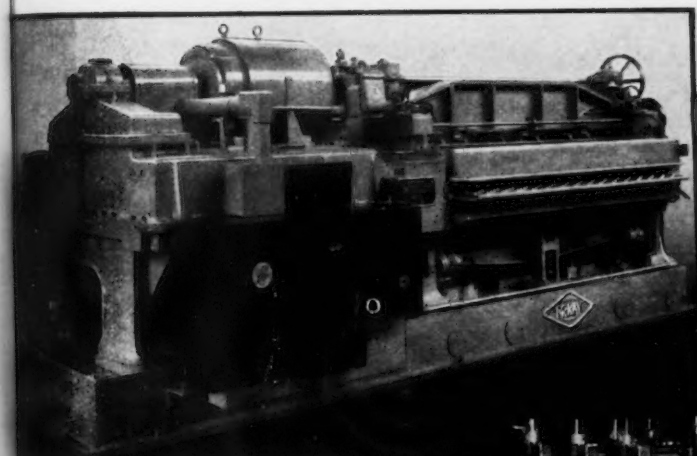
1



3



2



4

5. McKay Electric Tube Welder.

5



**McKAY MACHINE** *Company*  
 ENGINEERS AND MANUFACTURERS OF SHEET, TIN, AND STRIP MILL EQUIPMENT  
 YOUNGSTOWN, OHIO  
 ASSOCIATED COMPANY  
 The WEAN ENGINEERING CO., Inc. • WARREN, OHIO

## Brewster Retools to Make Dive Bombers

• • • Brewster Aeronautical Corp., Long Island City, N. Y., and Newark, N. J., is setting up new machine tools to convert its airplane production from fighter planes to Navy dive bombers, the completion of the retooling expected within a week.

Meanwhile, about 700 workmen have been laid off, but are expected to return to work when the retooling is finished. This is believed to be the first time that an airplane manufacturer has temporarily laid off workmen during such a changeover.

For the past year Brewster has been engaged in making Buffalo pursuit planes, all of which have been consigned to reinforce the fighting strength of the British Royal Air Force at Singapore and the Netherlands East Indies Air Force at Bandoeng, Java. With orders for these ships beginning to taper off, the company is rushing the retooling operations required for the mass production of the Buccaneer, a dive bomber for the United States Navy.

The Buccaneer carries a 1000 lb. bomb in its fuselage and can fly about 3000 miles non-stop. A version of the Buccaneer, known as the Bermuda, that differs slightly in details, will be built for the British and Netherlands East Indies flying forces.

## Southern Car Plant Reopens

*Birmingham*

• • • The plant of the Southern Car & Mfg. Co., closed Oct. 20 by a strike of employees belonging to the American Federation of Labor, reopened Oct. 31. Conciliators said a written agreement provided union recognition, wage increases and seniority rights.



**BREWSTER DIVE BOMBERS AND PURSUIT PLANES:** The upper two photos are views of the SBSA-1, U. S. Navy's newest high speed, long range dive bomber that carries a 1000-lb. bomb within its fuselage. Brewster Aeronautical Corp. is now tooling up to make these ships, as well as an export version, the Brewster Bermuda, for Great Britain and the Netherlands East Indies. The lower photo is of a squadron of Brewster Buffalo fighters delivered to the Netherlands East Indies.

## Foundry at Buffalo 100% on Defense

*Buffalo*

• • • The Strong Steel Foundry Co., here, a manufacturer of steel castings, has completed a switch-over from non-defense production to 100 per cent defense output, Calbraith P. Champlin, president, said last week.

About 35 per cent of the company's booked orders are prime contracts, directly from the government. A brick and steel addition to the cleaning has been planned to speed delivery.

## Republic Production Shatters Records

*Cleveland*

• • • Demands for steel for defense purposes have resulted in new production records by Republic Steel Corp. during October. These include: Pig iron, 451,056 tons against previous record of 447,713 tons; open hearth steel ingot, 758,499 tons, compared with previous record of 721,243 tons; electric furnace steel ingot record 58,668 tons, against previous record of 51,837 tons; Bessemer steel ingot record 64,687 tons, compared with 63,421 previous record.

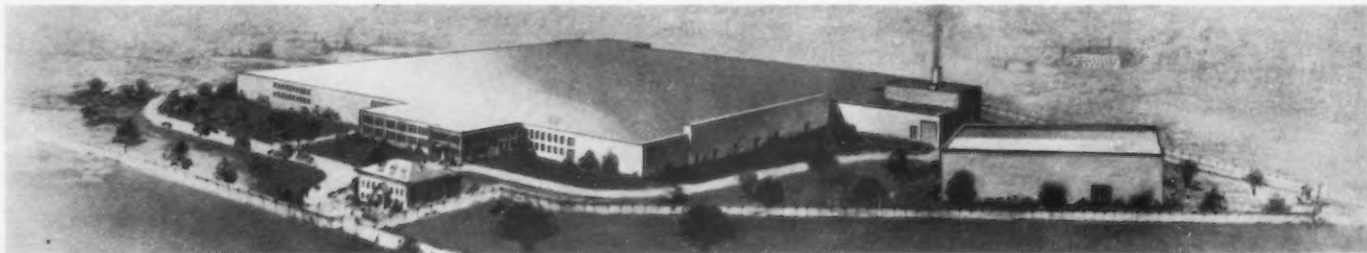
Virtually every operating district and division broke production records. During October, Republic operated at 107.2 per cent of capacity and for the first nine months of 1941 operated at 99.4 per cent of capacity.

## Shipping Delays Cause Loss in Defense Output

*Buffalo*

• • • A serious delay in shipments of chrome steel from Pittsburgh and rivets from a supplier in Brooklyn has resulted in a 20 per cent cut in the production of bomb shackle assemblies in the Spriesch Tool & Mfg. Co. plant, President Joseph J. Cheney said this week. He blamed the delay on "red tape" and the inability of government offices to work fast enough on priorities. Delivery of the bomb shackles is made to the Army Air Corps at Wright Field, Dayton, Ohio, from where they are distributed to manufacturers of bomber planes throughout the country for use on Army and Navy plants.

**BLACKOUT PLANT:** In anticipation of receiving final confirming orders from Washington, Allis-Chalmers Mfg. Co., Milwaukee, began clearing ground for its new \$9,066,000 supercharger plant at Milwaukee. To be completed in six months, this plant will be a real "blackout" factory, having no windows except in the offices. Fluorescent lighting for the entire production area will permit normal operation during any air raid attacks that may ever affect this area.



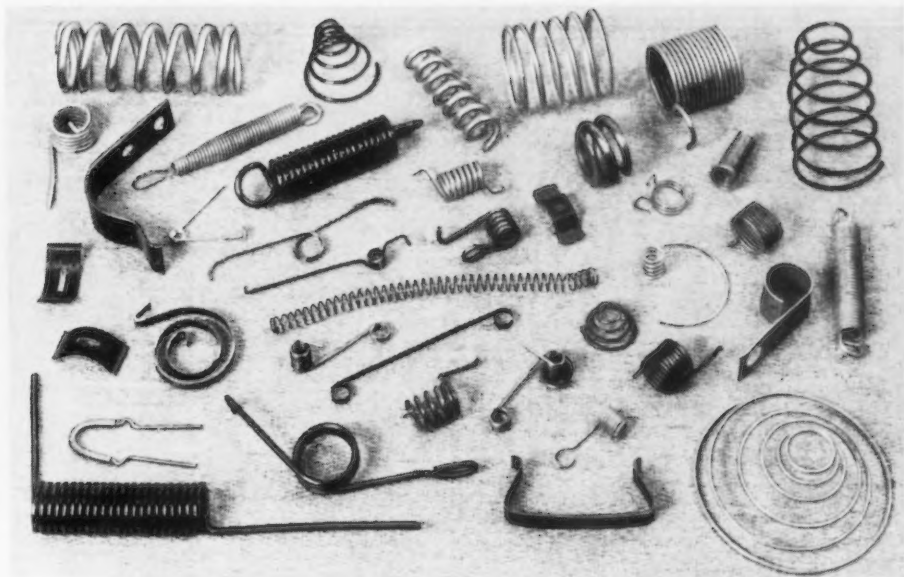


# PARTS LIKE THESE ARE IMPORTANT

## SPRINGS, STAMPINGS WIRE FORMS

### WASHERS, COTTERS AND EXPANSION PLUGS

Parts like these in one form or another are used in almost every kind of mechanism. They are used to perform all manners of operations and movements—often quite involved—and in most cases in locations where they cannot be observed.

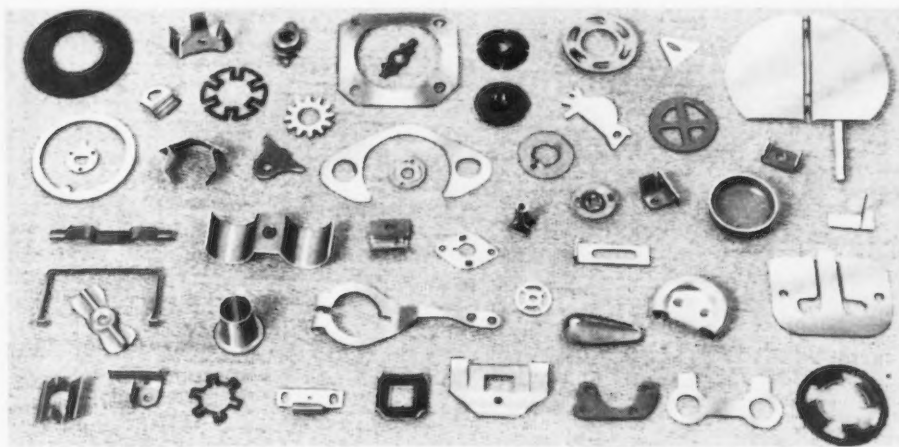


*Illustrated here are some of the vast variety of Springs made by Hubbard. They include Compression, Extension, Torsion and Flat Springs. They are made of Steel, Brass, Bronze, and other materials.*

Parts Like These and their application.

The purpose for which any of these parts are to be used should be described in detail; sketches or blueprints are desirable; samples, if parts are intended for replacements or improvements on ex-

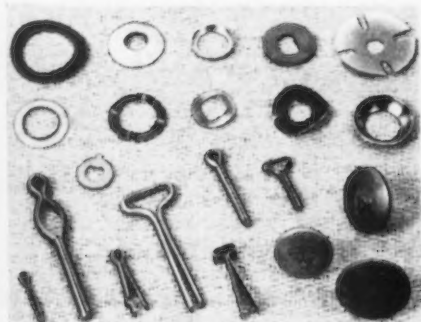
be given on tooling, heat treating and assemblies for Parts Like These; on their use and application toward the solution



*Small Stampings in all kinds of metals have covered a wide variety of shapes, forms and uses.*

Some of the hundreds of different shapes and forms produced by Hubbard are illustrated to give an idea of the scope of this work—in almost every case they represent the solution of a design or production problem—and the information and assistance Hubbard has to offer on

*Illustrated below—Washers, spring and flat, various types of Cotter Pins, and Expansion Plugs. Stock Sheets are available on these items.*



isting equipment.

In the case of springs, note in the illustration not only the different types made, but some of the many variations and modifications of the types; and the different kinds of ends and loops provided. In each case they represent a definite use and application in a manufacturer's product.

Small Stampings and Wire Forms supplied by Hubbard likewise have covered a wide range of use and application. Some of the various shapes and forms in which they have been furnished are illustrated. As in the case of Springs, they are formed, finished and heat treated in each case to meet a given specification and use.

Quite often suggestions helpful to users of Springs, Stampings or Wire Forms can



*Some Hubbard Wire Forms. Every one represents a different application.*

of design and production problems and in the development of new products.

So whether it is important National Defense units on which these facilities and our experience can assist you in making them better or faster, or on developing tomorrow's products, take advantage of them.



## M · D · HUBBARD SPRING COMPANY

325 CENTRAL AVENUE

PONTIAC, MICHIGAN

H-50

# Deadlines on Principal Monthly Reports to OPM on Metals

• • Listed below are principal reports being required by OPM from various metal fields on regular schedules. One-time and occasional reports have not been included. Some companies using numerous types of metals are required to file reports from a majority of the groups listed below. For example, a steel company in the East in addition to the reports listed under "Steel" below, files monthly consumer reports on aluminum, calcium-silicon, chromium, cobalt, copper, lead, nickel, pig iron, tungsten and vanadium. As suppliers, metal producers may file some of the reports listed in Section II below, when extension was necessary. A machine tool producer may file consumer reports on pig iron, aluminum and other metals in addition to such forms as PD-1, PD-81, PD-73, PD-25-c and E-2-a.

Monthly reports of one Middle West machine tool producer weighed 27 lbs. when sent in last month.

Most orders specify that all persons affected by the order shall keep and preserve for a period of not less than two years (and in some cases five years) accurate and complete records of inventories, details of all transactions, contracts, purchases, etc.; names of all parties involved in transactions; accurate record of preference ratings; and all other pertinent information. Most scrap metals must be reported upon. PD-149 is the new monthly report due by the 15th from producers of over 20 tons of iron or steel scrap per month and PD-150 is the consumers' report.

## SECTION I

METAL	FORM NO.	WHO FILES IT	WHEN IT IS FILED	NEXT REPORT	SUBJECT OF REPORT	WHERE IS IT SENT
ALUMINUM	PD-40	Purchaser	Monthly—by 20th	Nov. 20	Inventory at end of preceding month and consumption analysis (notaried)	Aluminum and Magnesium Branch, OPM Priorities Division, Washington
	PD-26	Producers, Fabricators and Secondary Smelters	Monthly—due on 20th of second preceding month	Nov. 20	Quadruplicate form giving contemplated shipping schedule (notaried)	E. M. Hopkins, Minerals and Metals, OPM, Washington
CALCIUM-SILICON	.....	Producer	Monthly		Report on actual shipments	Priorities Division, OPM, Washington
	PD-72	Purchaser	Monthly—by 25th	Nov. 25	Requirements for succeeding month and report on stocks (notaried)	
CHROMIUM	PD-53-a	Purchaser	Monthly—by 25th	Nov. 25	Detailed application covering requirements in next month, showing per cent of above for each customer	Director of Priorities, OPM, Washington, (2 copies)
	PD-53-b	Consumer	Monthly—by 25th	Nov. 25	Report on consumption, stocks, etc., in preceding month (notaried)	Director of Priorities, OPM, Washington (Original and one copy to Washington; copy to supplier)
COBALT	PD-152	Consumer	Monthly—by 20th	Nov. 20	Requirements for month	OPM Priorities, Washington
	PD-153	Consumer	Monthly—by 20th	Nov. 20	Report on stocks, etc.	OPM Priorities, Washington
COPPER	PD-59-a	Fabricator	Monthly—by 20th	Nov. 20	Application in triplicate for next month's supply for domestic consumption	OPM Copper Commodity Branch, Washington
	PD-60-b	Fabricator	Monthly—by 20th	Nov. 20	Triplicate report on requirements for various classifications	OPM Copper Commodity Branch, Washington
LEAD	PD-61	Refiner	Monthly		Output and shipments of duty free copper	OPM Copper Commodity Branch, Washington
	PD-66-a	Consumer	Monthly—by 15th	Nov. 15	Application for allocation in next month, giving inventory, etc.	OPM Lead Commodity Branch, Washington
	PD-124	Producer	Monthly—by 20th	Nov. 20	Schedule of proposed shipments in next month, customer's names, etc.	OPM Lead Commodity Branch, Washington
NICKEL	PD-27	Purchaser	Monthly—by 20th	Nov. 20	Report of requirements in next month, stocks, with customer's names. (Notaried)	OPM Priorities, Washington (Copy of Sched. II to supplier)



PIG IRON	PD-69	Customer	Monthly—by 5th	Dec. 5	Requirements during coming month (Quadruplicate; notarified)	To Producer
STEEL	FD-70	Customer	Monthly—by 15th	Nov. 15	Report of inventory and consumption. Notarified	Iron and Steel Branch OPM, Washington
	FD-71	Producer	Monthly—by 15th	Nov. 15	Shipping schedule for following month. Quadruplicate	Iron and Steel Branch, OPM, Washington
	FD-83	Warehouse	Monthly—by 15th	Nov. 15	Report of shipments in preceding month, receipts and inventory	Iron and Steel Branch, OPM, Washington
	FD-89	Producer	Monthly—by 6th	Dec. 6	Scheduled production and proposed distribution	Iron and Steel Branch, OPM, Washington
TUNGSTEN	FD-100	Producer	Monthly—by 6th	Dec. 6	Capacity, allocation and rolling schedule	Iron and Steel Branch, OPM, Washington
	FD-101	Producer	Quarterly	Nov. 25	High speed steel orders and shipments made	Iron and Steel Branch, OPM, Washington
	AIS-16	Producer	Monthly—by 25th	Nov. 15	Report of shipments by consuming industries	Copy to OPM and copy to A.I. & S.I.
	AIS-17	Producer	Monthly—by 15th	Nov. 15	Shipments and unfilled tonnage reports	Copy to OPM and copy to A.I. & S.I.
	AIS-17-a	Producer	Monthly—by 15th	Nov. 15	Shipments and unfilled tonnage reports	Copy to OPM and copy to A.I. & S.I.
VANADIUM	FD-9	Purchaser	Monthly—by 10th	Dec. 10	Request for allocation in following month and report on stocks	OPM Priorities, Washington
	FD-84	Purchaser	Monthly—before 25th	Nov. 25	Inventories for current month, and consumption in preceding month, probable consumption in following month	OPM Priorities, Washington
ZINC	FD-5C-a	Producer	Monthly—by 10th	Dec. 10	Statement of compliance and list of orders lacking FD-50 during preceding month	Copper-Zinc Branch, OPM, Washington
	FD-94	Customer	Monthly—by 10th	Dec. 10	Application for allocation in following month; report of consumption in preceding month; inventory for current month	Copper-Zinc Branch, OPM, Washington

## SECTION II

Monthly reports by producers and suppliers showing tabulation of preference rated orders extended in the previous month are due as follows:

Monthly, by the 15th (Next report due Nov. 15)

Monthly, by the 5th (Next report due Dec. 5)

Aircraft Maintenance PD-81 (or PD-81-a)  
 Airframes, heavy bomber PD-43 (or PD-43-a)  
 Airplane Engines and Props PD-14  
 Auto and truck parts  
 Cranes PD-81 (PD-81-a)  
 Cutting Tools FD-6 (or PD-6-a)  
 Engines, heavy bomber PD-44 (PD-44-a)  
 Farm Machinery Repair PD-81 (PD-81-a)  
 Freight Cars PD-38 (PD-38-a)  
 Gun Turrets, bomber PD-46 (PD-46-a)  
 Gunights, etc., bomber PD-47 (PD-47-a)  
 Locomotive Repair PD-64 (PD-64-a)  
 Locomotive Making PD-65 (PD-65-a)  
 Machine Tools PD-81 (PD-81-a)  
 Propellers, bomber PD-45 (PD-45-a)  
 Radio Equipment PD-58 (PD-58-a)  
 Relays and Solenoids PD-67 (PD-67-a)  
 Welding Equipment PD-81 (PD-81-a)

### Motor Trucks

Monthly, by the 10th (Next report due Dec. 10)

Airframes PD-13  
 Mines PD-119  
 Shipbuilders PD-30 (PD-30-a)  
 Tanks, light PD-81 (PD-81-a)  
 Tanks, medium PD-81 (PD-81-a)

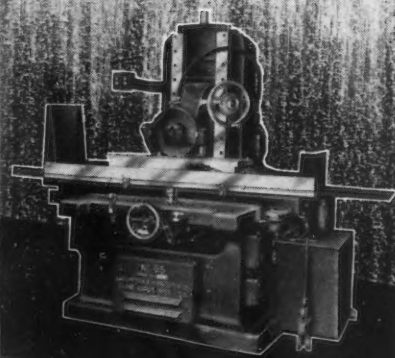
Monthly, by the 20th (Next report due Nov. 20)

### Laboratories PD-93

Monthly, by the 25th (Next report due Nov. 25)

Shipyards PD-56 (PD-56-a)

# The choice OF EXPERIENCE



## GRAND RAPIDS HYDRAULIC FEED SURFACE GRINDERS

### VERNIER CONTROL



These high-speed Type 55 Surface Grinders combine ruggedness of design with extreme accuracy. Vernier control has .0001" graduations, approx. 1/8" apart, which may easily be split.

Table Speed to 125 ft/min.

Table Movement: 13½ x 38"

Table Size: 12x36"

Catalog GL-100 on request

## GALLMEYER & LIVINGSTON CO.

200 STRAIGHT AVENUE, S.W.  
GRAND RAPIDS, MICH.

## THIS WEEK'S

### Priorities and Prices

Current lead prices are adequate, according to OPA, to support a substantial increase in output. Statement made in answer to reports that lead prices were to be advanced. (OPA:PM1500)

Copper sheet, strip and screen used in building construction may be manufactured and used at a reduced rate until Jan. 1, instead of until Nov. 1 as previously ordered, in amendment to order M-9-c which restricts use of such materials. (OPM:PM1494)

Cobalt placed under full priority control in order M-39 issued Nov. 4. (OPM:PM1492)

Copper output of three high-cost Michigan producers contracted for at a price in excess of the domestic ceiling. (Treasury Dept.: 28-33)

Copper wire and cable prices should not exceed their Oct. 15 levels, OPA has advised manufacturers of such products. (OPA: PM1502)

Aluminum scrap and secondary ingot price schedule No. 2 amended to incorporate previously announced reductions ranging from 1c. to 3c. a lb. New Quantity differentials also announced. (OPA: T35)

Repairs and maintenance supplies for public utilities and mining and industrial operations in the Philippine Islands extended priority assistance in interpretations of Order P-22, P-46 and P-56 issued Nov. 5 (OPM:PM1498)

Automobile production schedules for January under limitation order L-2-c formalized in supplement to the order. (OPM:PM1512)

Heavy motor truck, medium truck and trailer production regulations under Orders P-54 and L-1-a extended to Jan. 31 (OPM:PM1508)

Metal office furniture, safe and cabinet, production limited by Order L-13 issued Nov. 7. Manufacturers of these items requested not to raise prices above Nov. 6 level. (OPM:1513 and OPA:1533)

Publicker Commercial Alcohol Co., Philadelphia, granted permission to produce 4,000,000 gal. of ethyl alcohol from raw sugar to sell above established ceilings. (OPA:PM1516)

Cooking and heating stove and radio makers asked not to raise prices above levels prevailing recently. (OPA:PM1510)

Glass making machinery, printing press and other printing machinery manufacturers will be requested shortly not to advance prices above July 29 level. (OPA:PM1514)

Priorities for steel for the proposed 1500 mile National Defense Pipeline denied by SPAB. (SPAB:SPA13)

Cellophane and similar transparent materials derived from cellulose banned for numerous uses in order L-20 issued Nov. 8. (OPM: PM1524)

For copies of above announcements address defense agency concerned, at Washington, giving announcement number as shown in parentheses after each paragraph (OPM:PM1300 means announcement 1300 issued by Office of Production Management.)

### Conveyor Building and Elevator Repairs Aided

Washington

••• An A-3 preference rating was granted to speed production of materials for repairs to elevators, escalators and construction of conveyor machinery in a dual plan set forth in orders P-72 and P-78 made public Nov. 11 by OPM. The orders are to expire Jan. 31, 1942, and will not be extended, as a plan of allocation is contemplated in keeping with SPAB'S recently announced policy. Suppliers as well as producers may benefit upon

filing acceptance of the terms.

The rating is confined to materials on the current critical list, and cannot be used for material containing aluminum or magnesium. The rating is for application to the following items only: castings and forgings; sheets, bars, shapes, plates, and tubing (ferrous-non-metallic and non-ferrous to the extent permissible under the terms of conservation order M-9-c, known as the copper order); electrical equipment and accessories; mechanical equipment and accessories; cutting tools, cemented carbides, and maintenance and shop supplies.



## Revision for The Iron Age Priorities Guide

• • • The following revisions should be made to THE IRON AGE Priorities Guide No. 2, which appeared in the issue of Oct. 23, to keep the Guide up to date.

Insert following under "L Orders" on page 4.

L-2-c — Automobile production schedule for January.

L-16—Restricts consumption of electric power in Southeastern area.

L-13 — Restricts production of metal office furniture.

Under "M Orders," page 4, add the following:

M-9-b—Copper and alloy scrap.

M-9-c — Curtails use of copper in certain products. (10-21)

Items listed below should be inserted in their proper alphabetical position in the "Index" on pages 1 and 2.

Electric power—L-16

Office furniture, steel—L-13

Insert these PD-Forms and descriptions in the proper order on pages 6 and 7.

PD-82—Application for preference rating for scarce materials.

PD-83-b—Steel warehouse preference rating certificate.

PD-94—Monthly application for allocation of zinc.

PD-98—Monthly inventory and consumption report concerning aluminum foil.

PD-115—Application for preference rating re Order P-11.

PD-117—Report concerning Order P-23.

PD-118—Report of withdrawals re Order P-46.

PD-121—Monthly report of copper scrap consumer.

PD-123 — November requirements of copper and copper alloys (obsolete).

PD-124—Proposed monthly delivery schedule of lead, re Order M-38.

PD-125 — Monthly report of makers of mechanical refrigerators.

PD-126 — Dealers' application for listing as melters under copper scrap order.

PD-127—Purchasers' certificate re Order M-41.

PD-130—Application by melters or processors for preference rating under copper scrap order.

PD-149—Producers' monthly report of stocks, production and shipments of iron and steel scrap.

PD-150 — Consumers' monthly report on stocks of, consumption and production of scrap.

PD-151—Dealers' and brokers' monthly report on stocks, receipts and shipments of iron and steel scrap.

P-N—Machine tool rebuilding given rating of A-1-c for scarce material.



**LARGE  
STEEL CASTINGS**  
a specialty with  
*"Standard"*

Cast steel Guide Vane made by Standard for an I.P. Morris Turbine.

**Standard is equipped to supply steel castings of unusual size and shape to suit your requirements.**

**The acid open hearth steel is produced in Standard's furnaces under the control of trained metallurgists.**

**Standard's long experience and expert personnel is reflected in the high quality of its products.**

CASTINGS • FORGINGS • WELDLESS RINGS • WROUGHT STEEL WHEELS

**STANDARD STEEL WORKS**

*Division of* THE BALDWIN LOCOMOTIVE WORKS  
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Other Members of the Baldwin Group • THE BALDWIN LOCOMOTIVE WORKS  
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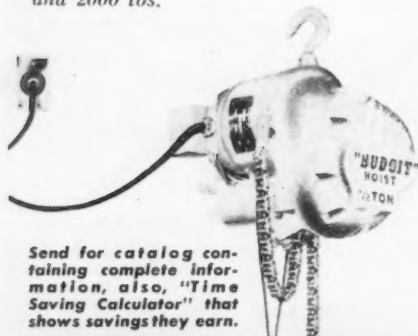
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Why waste a worker's strength lifting heavy burdens when a **PORTABLE, ELECTRIC 'BUDGIT' HOIST** lifts faster and at a lower cost! It takes no time to install—**HANG UP, PLUG IN AND USE.**

Free Labor's hands and brains to **PRODUCE FOR DEFENSE.** (More profit follows as a secondary advantage.) Rid every worker of the danger from strain and rupture and send him home at night **LESS TIRED**—more ready for a busy tomorrow.

In thousands of installations, in hundreds of industries, **'BUDGIT' HOISTS HAVE PROVED THEMSELVES.** They are lifting a goodly share of the burden of defense.

Write us now for full details about 'Budgit' Hoists from **\$119** up with lifting capacities of 250, 500, 1000, and 2000 lbs.



Send for catalog containing complete information, also, "Time Saving Calculator" that shows savings they earn.



## 'BUDGIT' HOISTS

**SHAW-BOX CRANE & HOIST DIVISION  
MANNING, MAXWELL & MOORE, INC.**

**MUSKEGON, MICHIGAN**

Makers of all types and sizes of Electric and Hand Operated Cranes and Electric Hoists . . . Send all your crane and hoist inquiries to Shaw-Box.

## Priorities Will Speed Steel Mill Repairs

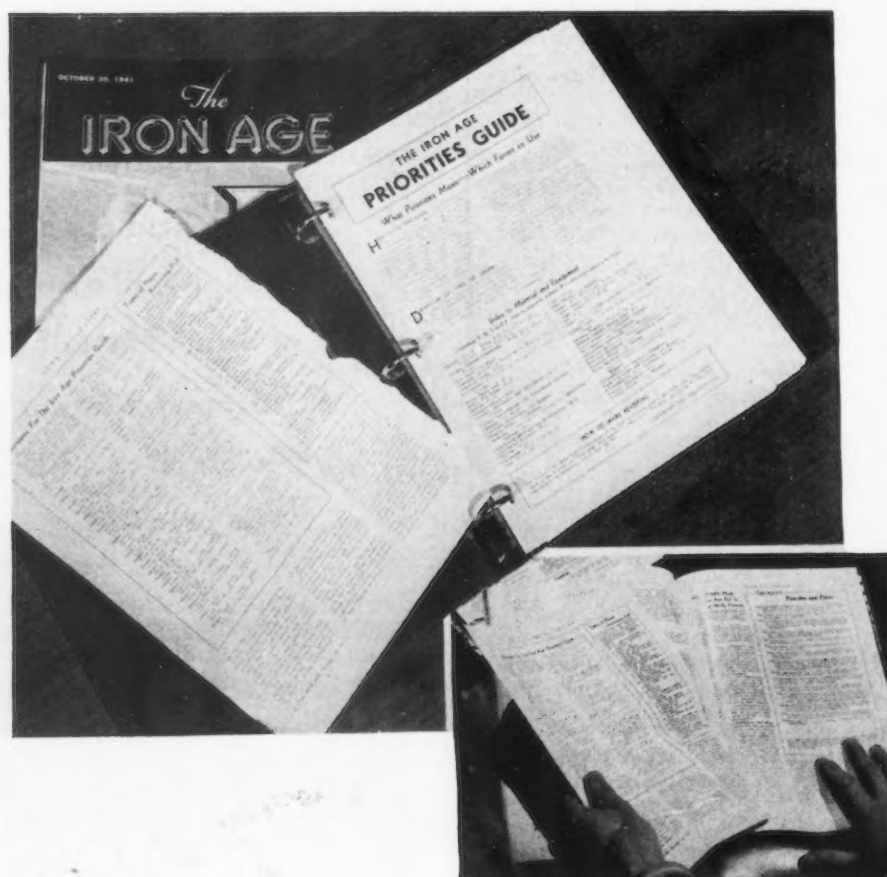
• • • OPM, in the preference rating order, P-68, for iron and steel production maintenance, repair and supplies, pulls repairs, maintenance and operating supplies for the steel industry out of the general repair classification and places it with priorities ranging from A-1-a to A-3. A-1-a ratings are applied to deliveries to a steel producer of material for repair when there has been a breakdown or suspension of operations because of breakdown and when the repair parts are not otherwise available. Heretofore, A-10 ratings were applied for such repairs, under preference rating order P-22.

Similarly, A-1-c ratings are applied to deliveries to a producer of

material up to the minimum required to make reasonable advance provision to avert actual breaking down or suspension of existing facilities. A-3 ratings apply to both the supplier of material required by a producer for maintenance, repair or operating supplies or to be incorporated in other material so required by a producer, and to deliveries to a producer of material for repairs other than for emergency, for maintenance and for operating supplies.

The preference ratings A-1-a and A-1-c assigned may be applied by the producer only, and the A-3 rating, for deliveries to a supplier of material, may be applied by the supplier, provided he requires the material to make deliveries to the producer. Before applying any preference ratings under P-68, however, the producer shall file

**PRIORITIES GUIDE:** Thousands of copies of **THE IRON AGE** Priorities Guide, including the "How and Wherefore" of the priorities system as applied to metal products, have been sold to U. S. manufacturers. Revisions in the Guide, which includes a description of each order, the related forms, methods of extensions and other vital data, appear weekly in this publication. Reprints of the Guide may be obtained for a time at 25c. a single copy. Prices for quantities are: 11 to 100—20c. each; 101 to 300—18c. each; 300 or more—15c. each. To avoid bookkeeping entries, please send stamps for small quantities.





with the Iron and Steel Branch of OPM a statement setting forth amounts of material used for repair, maintenance and operation supplies for the first six months of 1941, inventories of such material on Dec. 31, 1940, and on June 30, 1941, and must further state that he accepts the terms and conditions of Order P-68. Upon receipt of this statement, OPM will issue a serial number that will thereafter be endorsed on all purchase orders or contracts for material by it or for its account.

Before a producer can apply a specific A-1-a or A-1-c rating, he must communicate with the Iron and Steel Branch, OPM, describing the material needed for emergency repair and the nature of the emergency or the reasons why advance provision is necessary to avert breakdown or suspension. Approval will be forwarded by the Director of Priorities to the producer and a copy of such approval shall be furnished by the producer to the supplier to evidence the A-1-a or A-1-c rating. The OPM further requires the indorsement of a statement guaranteeing that material ordered is for repair, maintenance or operating supplies in iron, steel, blast furnace, coke or ferroalloys plants, showing the preference rating, assigned serial number, and that the material is in compliance with preference rating order P-68. This statement, signed by a responsible official duly designated for such purposes by the producer or supplier, must be endorsed on the original and all copies of the purchase order or contract for such material. The purchase order or contract so endorsed shall be delivered to the seller of material and the endorsement constitutes a certification to the OPM that the terms of P-68 are accepted and material is for purposes stated therein.

### Priority Orders Take 80% Of Sheet Output

Cincinnati

• • • Priority sheet steel business is running close to 80% of the sheet steel output in this area. One plant reports a 35 per cent margin for general civilian needs on all items except galvanized sheets, but virtually all other producers are filled with priority business for the remainder of the year.



### *Instant Reversal*

of the air cylinder upon release of this foot pedal valve means faster operation of air powered equipment. Control is simpler, more convenient, and the operator's hands are free for other work. This spring return valve is especially adapted to arbor presses, riveters, etc.

The Hannifin disc-type design has no packing, and no leakage or packing maintenance troubles. Made in 3-way and 4-way types, hand and foot operated, for control of all types of air operated equipment. Write for Valve Bulletin 34-A.

**HANNIFIN**  
**MANUFACTURING COMPANY**  
621-631 South Kolmar Avenue  
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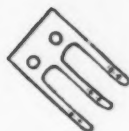
ENGINEERS • DESIGNERS • MANUFACTURERS • DOUBLE-ACTING PNEUMATIC AND HYDRAULIC CYLINDERS • ALL SIZES

## HANNIFIN *"Packless"* VALVES AIR CONTROL

*the practical side of Springmaking* — BY DUNBAR

### We Fix Flats (SPRINGS)

Limited technical information can be given about flat springs because of the infinite number of shapes that can be utilized. Your springmaker (us, we hope) can supply a fund of experience from past performances. Heat treating and getting flat springs through the heat treating process without vexing distortions is the springmaker's province. "You dream it and we'll do it" seems to be the appropriate message.

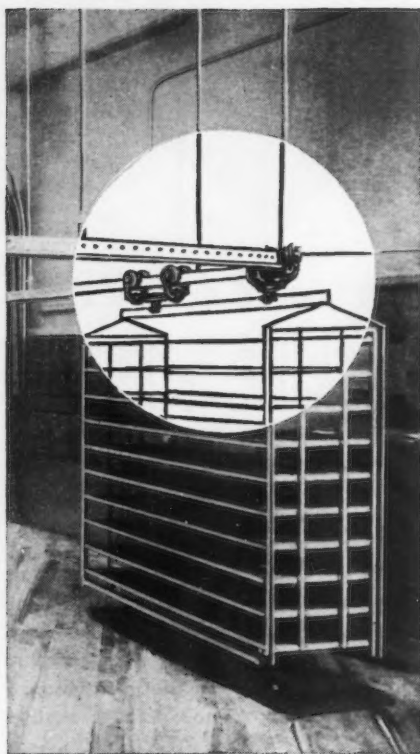


**Dunbar Bros. Co.**

DIVISION OF ASSOCIATED SPRING CORPORATION

BRISTOL, CONNECTICUT

"Quality Springs since 1845"



**SIMPLE SIMON  
MET A PIEMAN**



**...WITH A BANG!**

YES, collisions and confusion were a daily problem till this California bakery adopted Reading Monorails. No sort of traffic control had proven entirely satisfactory until the racks were hung on overhead tracks.

But then everything smoothed out like magic. No more bumps. No more spilled loaves of bread. No more mashed pies. Aisles were always clear of racks and free movement through the plant was facilitated.

Expensive? Not at all. Hangers were simply welded to the old racks and old wheel assemblies removed. The only expense was this operation and the low-cost monorail equipment.

Is this an idea you might use? Why not see for yourself how little it would cost? Write us the details.

**READING CHAIN & BLOCK CORP.**  
DEPT. 212 READING, PA.

**READING**

Chain Hoists, Electric Hoists,  
Cranes and Monorails

## Development of Allocation Plan Is Revealed by OPM

Washington

• • • The proposed allocation system for the iron and steel industry was expanded in an OPM order last Friday which embraces all critical materials throughout American industry, thus bringing virtually all industries, producing and consuming, under direct Government control.

The long-anticipated order, providing for what SPAB calls an "all-out allocation program," will require considerable time before it is completely effectuated. Consequently, there will be no sudden elimination of the priority system. Further, it is evident that despite the comprehensive character of the "all-out allocation" plan, priorities will prevail for an extended period and in all probability will not be entirely abandoned.

Applying an allocation system to iron and steel will be a protracted and difficult undertaking, and with the system applied to all industries the complication will be multiplied many times, yet OPM thinks the system will afford more expeditious and equitable production and distribution.

At the same time, while defense production and distribution can be determined on a rather arbitrary basis, the process of an equitable production and distribution for "essential civilian" requirements, manifestly, is beset with complexity. Non-essential requirements, it is contemplated, will be entirely out of the picture.

To start the "all-out allocation system," OPM's order, effective Dec. 1, changes the PD-1 preference rating application until that date. Each OPM industrial branch receiving an application for such rating is required to transmit the application with its recommendation to the branch responsible to the principal product into which the material or product shall flow. If the branches are in agreement, the order pointed out, the application shall be forwarded to the Priorities Division for final review. In case of disagreement, the end product branch may cancel or lower the rating, and transmit the application to the Priorities Division,

advising the initiating branch of the changes. If a higher rating is desired, the end product branch shall confer with the initiating branch. In the event of disagreement, the recommendations will be transmitted to the Priorities Division for decision.

The new routing system, it was stated, is designed to permit current operations to dovetail into the whole broad project. Under this plan, PD-1 ratings call for review of applications by the industrial branch handling the product. The branch will determine the desirability of obtaining the product or service asked for, delivery, etc., and finally agreement is reached between the several branches as to the amount of material which can be allocated. If common agreements cannot be reached, the application, together with the recommendations of the branches, will be forwarded to the Priorities Division for final determination of the rating to be assigned.

SPAB's announcement laid down the principle that where feasible, the allocation program should be developed in such a way that minimum quantities of the needed materials should be assured to essential industries whose operations are curtailed.

The announcement, in part, was as follows:

"1. SPAB announced that it had authorized its executive director to request OPM to obtain detailed production programs, industry by industry, for 1942. It also directed that these programs should show similar requirements for repair parts and capital expenditures.

"In substance, the development of an allocation program will proceed roughly as follows: An industrial branch in OPM takes the first step, calling on its several sections to develop requirements programs for each industry which manufactures the products for which the branch is responsible. Each program is built up by the branch or by its section, through consultation with the industry advisory committee involved and also through discussion with either or both of the armed services.

"Or, as an example: a program for the manufacturers of plumbing equipment would be initiated in the plumbing and heating branch of the Division of Civilian Supply. It would be worked up in consultation with the industry,





**DEFENSE REPORTER:** Fulton Lewis, Jr., reports on the progress of the U. S. industry in filling defense needs. Shown above, using a super sensitive throat microphone, is Lewis during a broadcast from the Kearny, N. J., plant of Western Electric Co. Sponsored by the National Association of Manufacturers, Lewis' broadcasts from the nation's industrial plants are heard every Monday from 9.15 to 9.30 over the Mutual network.

and cross-checked to see how the military requirements situation might affect it. Then, when it had been put in shape, it would be referred to the various raw materials groups—the iron and steel branch, the copper branch, etc.—for a final checking.

"Thus, in effect, each program would originate with the group which is responsible for the end product, with the raw materials groups coming into the picture in an advisory and consultative capacity. Since all programs must of necessity be decreased or increased as armament production rises, each will be framed so that it can be modified upward or downward in case of need. When a program has been drawn up, it will be reviewed carefully in order to cut

down the use of critical materials to the greatest possible extent through simplification of lines, substitution, and so on. The OPM Bureau of Industrial Conservation will work with and through the industrial branches to accomplish this.

"When the program drawn up along these lines has been agreed upon by the branches involved, it will be presented to the executive director of SPAB, in order that it may be properly synchronized with other programs. It is then presented to SPAB.

"After SPAB has passed on a program—either approving it, modifying it, or taking such other action as seems advisable—the program is referred to the OPM Priorities Division, which undertakes to make it effective and, where possible, to make sure that the needed quantities of goods will in fact be available, through the issuance of the required priorities ratings or through allocation of materials."

### Formal OPM Order Sets January Auto Quotas

Washington

••• OPM Director of Priorities Donald M. Nelson last Thursday issued a formal order setting January 1942 passenger car production maximums for the automobile industry. The figures, which were first announced on Oct. 15, are General Motors, 90,567; Chrysler Corp., 47,271; Ford Motor Co., 38,009; Studebaker 8834; Hudson, 6476; Nash-Lafayette, 5500; Packard, 5771; Willys-Overland, 1944; Crosley, 476.

### OPA Freezes More Prices

Washington

••• Manufacturers of a wide range of metal office furniture and equipment, glass making machinery, printing presses and other printing machinery were requested last week by OPA not to raise prices above recent levels.

### Arsenal Employs 9816

Rock Island, Ill.

••• Employment at the arsenal here will reach 10,000 before the end of the year. Present figure is 9816 not including 187 WPA workers. More than 13,000 were employed here in November, 1918.

## STACKING BOXES and STACK-UNITS



## KEEP SMALL PARTS ON THE GO!



Efficient handling and storing of small parts are important in this production drive of industry. That's why A-S-E Stack-Units and Stacking Boxes are being used by so many industrial concerns.

A-S-E Shop Equipment is helping them do their job easier and faster. Valuable time is being saved by this well-made and well-designed equipment . . . on the assembly line . . . in the stock room . . . in inter-departmental handling . . .

in many parts of the plant.

### A-S-E STACKING BOXES

Rigidly constructed, A-S-E Stacking Boxes are able to withstand rough use and hard wear. They are being used to save time in the handling and storing of small parts. Inter-plant and departmental handling are faster and more economical. Positive stacking is assured. Corners cannot open up. There is no telescoping or unstacking from vibration. Made in many sizes and gauges to fill production needs.

### A-S-E STACK-UNITS

Their open fronts are especially advantageous . . . contents are kept quickly accessible. Important time is saved in assembly operation. Small parts can be "poured out" without handling. Stack interchangeably with stacking boxes of same size.



Write today for full details on these and many other production increasing A-S-E products.

**ALL-STEEL-EQUIP COMPANY, Inc.**  
711 JOHN STREET  
AURORA ILLINOIS

## Copy of Steel Import Orders Requested by Canada

Ottawa, Ont.

• • • F. B. Kilbourn, steel controller, has ordered all importers of steel and steel products from the United States to submit before Nov. 15 one copy of all orders already placed, accepted, submitted, or pending acceptance in the Unit-

ed States, and now outstanding unshipped.

The instructions, which also cover all orders for steel and steel products for further processing or fabrication in Canada, require the further submission on and after Nov. 1 of one copy of all such orders. Machinery, equipment, and spare parts are exempt. Importers must give the weights of materials involved.

## Amendment Gives Aid On Building Materials

Washington

• • • **Copper**, sheet strip and screen manufacturers had restrictions imposed by OPM's Division of Priorities eased by an amendment of the original order M-9-c to permit the use of the metal in articles necessary for building construction until Jan. 1, 1942, instead of Nov. 1, 1941. Manufacturers may now operate at a reduced rate, since the original restriction had frozen stocks of already fabricated materials.

The use of copper equal to 50 per cent of the total amount of copper used during the period from July 1, to September 30, 1941, is permitted.

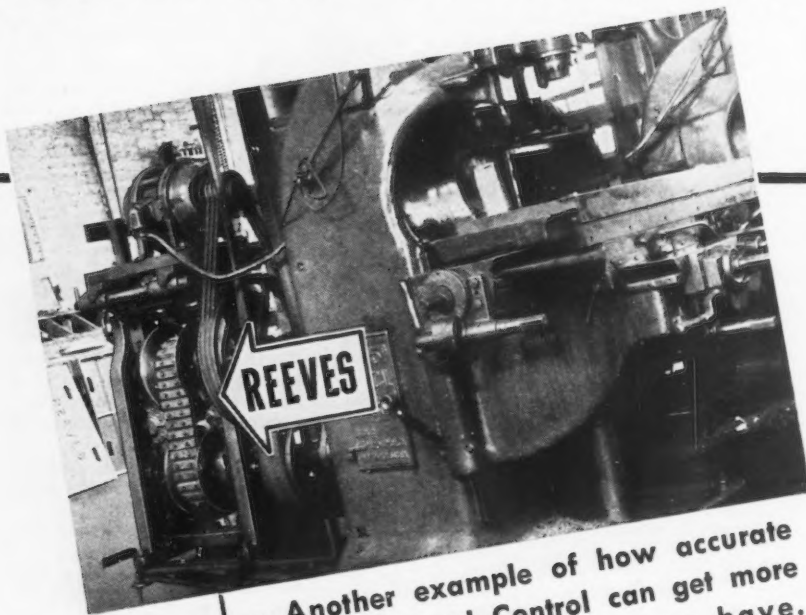
## Lukens Lifted Premium Rate, Not Base Wage Rate

• • • **Lukens Steel Co.**, Coatesville, Pa., recently advanced the rate of premium under the incentive pay system operating for its employees. The base rate of pay, incorrectly described in THE IRON AGE as "increased," was not affected by the incentive revision which increases Lukens' payroll by approximately \$250,000 a year.

**DEPTH CHARGES ON A CORVETTE:** Fast, and capable of being built more quickly than destroyers, the new class of anti-submarine ships called Corvettes, are reported playing an important role in British efforts to keep the Atlantic ship lanes opened. Seamen are shown here preparing a depth charge thrower on one of the corvettes.

Wide World

*Any Speed* FROM 118 R.P.M.  
TO 650 R.P.M. ON THIS MILLER



✓ Another example of how accurate variable Speed Control can get more work from machines you have.

By installing a REEVES Variable Speed Transmission, 6:1 ratio, with individual motor drive, on this vertical milling machine, the all-important "in between" speeds are instantly available.

When the machine is in open belt position, any spindle speed from 118 to 650 r.p.m. is secured. Furthermore, infinite speed selectivity of the REEVES gives an overlap of speeds in open

belt and back gear positions so that every needed speed for a wide range of cutter sizes is available at the turn of a handwheel.

If you are engaged in defense production and want a faster and more uniform output from old machines in your plant, find out how REEVES Variable Speed Drives can help you. Write us today.

REEVES PULLEY CO., Dept. I, Columbus, Ind.

# REEVES SPEED CONTROL







**A DUKE AND A TANK:** The Duke of Windsor squeezes out of an M-3 army tank in which he rode during his recent visit to the new Chrysler Tank Arsenal in Detroit. K. T. Keller, president of Chrysler Corp., is shown assisting the Duke.

### Question of Absorption On Pig Iron Clarified

• • • In its issue of Oct. 30, page 94, *THE IRON AGE* said that on shipments of pig iron to basing point areas outside of the one where the pig iron is produced, the customer absorbs all the freight costs except a compromise amount of \$1 a ton on the material so shipped. As a matter of clarification it should be pointed out that it is the policy of OPA that under its price schedule pig iron producers are required to absorb freight as heretofore except that on shipments of dislocated tonnage the customer is required to pay the freight less \$1 which is absorbed by the furnace. Dislocated tonnage shipments are described as movements to territories that are not normally served by a given furnace. Hence if a furnace has been normally serving a customer outside its territory it will be required to continue to absorb freight as heretofore.

### Dutch Guiana Bauxite Playing a Key Role

Washington

• • • Because of its bauxite, Dutch Guiana will play a key role in hemispheric defense.

According to an article in the Nov. 8 issue of "Foreign Commerce Weekly," the high-grade bauxite deposits there assure the

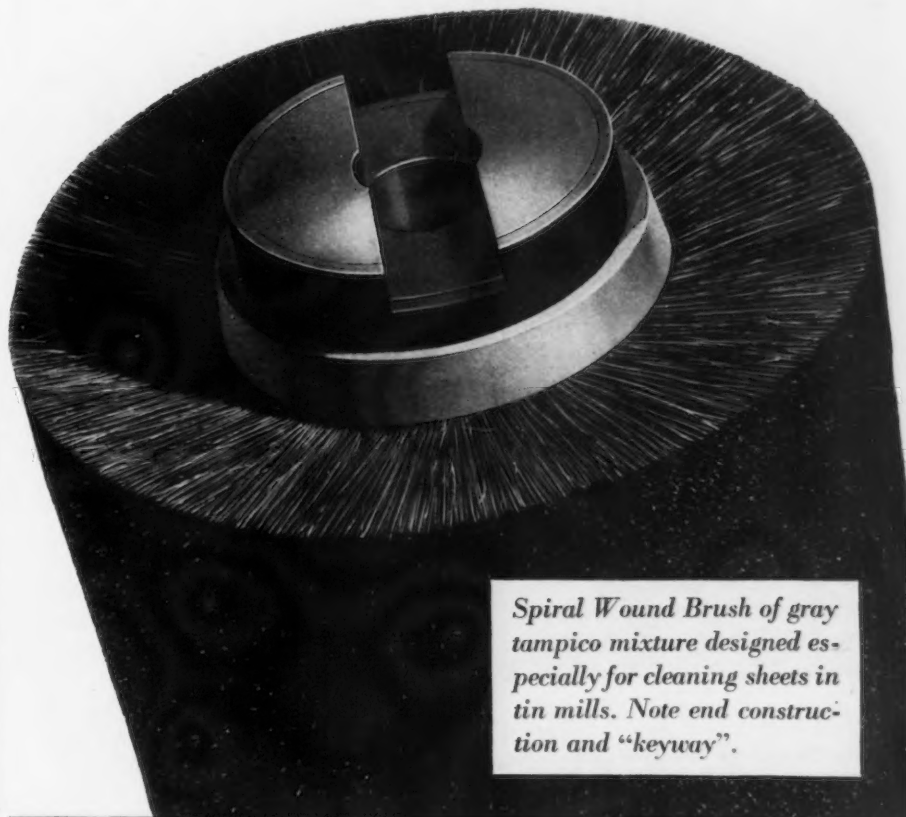
Western Hemisphere of complete independence indefinitely with respect to the raw material, which is now shipped to the United States. Exports of the ore have risen from 125,000 gross tons in 1932 to 586,000 gross tons in 1940. New fields in Surinam are expected to yield about half the anticipated 1,200,000 gross tons of bauxite produced in 1941.

## More Speed Ahead!

• No trouble to cut finishing time for light gauge steel and tin plate! Just install Pittsburgh Plate Glass Company's Spiral Wound Brushes. *Investigate!*

"Pittsburgh" Spiral Wound Brushes can be built to your order in various fills—nickel silver wire, horsehair and tampico.

Consult with our engineering representatives. Write or telephone—today.



*Spiral Wound Brush of gray tampico mixture designed especially for cleaning sheets in tin mills. Note end construction and "keyway".*

**PITTSBURGH  
PLATE GLASS COMPANY**

*Brush Division • Baltimore, Md.*

**WAREHOUSES IN 81 IMPORTANT MARKET AREAS**

## American Steel Foundries to Operate Armor Plate Plant

Chicago

••• American Steel Foundries has signed an agreement to operate an \$18,000,000 cast armor plate tank plant on property adjacent the firm's establishment at Indiana Harbor. O. E. Mount, secretary-treasurer of the company, informed THE IRON AGE that building will be under way before the end of

the year if the government's signature comes through in time. The plant will be operated on a fixed fee basis.

## Electric Unit Starts

••• A new Pittsburgh Lectromelt furnace for the production of manganese steel, was put into operation Oct. 29 at the High Bridge, N. J., plant of the Taylor-Wharton Iron & Steel Co.

## CIO Convention Delays Action by Steel Union

Chicago

••• "A lull before the storm" is what steelmen here call the quiet that has ruled the local steel labor situation for the past two weeks. Chief labor negotiator for one leading mill here told THE IRON AGE that another blow-up will likely come after the national CIO convention this month.

That the convention will be a riotous affair, there is no doubt. The factions supporting John L. Lewis and Philip Murray will come to blows for control of the CIO. The "agreement" between certain CIO and AFL leaders here guaranteeing non-invasion of ranks has set a blaze going among CIO locals not a party to the agreement. This in itself will bring a battle to the convention floor.

It is fairly clear that the drive for the closed shop in steel has momentarily bogged down because of internal dissension as well as outside factors. Negotiations with "Little Steel" have been painfully slow on the union side because labor leaders are not sure of how far they want to go. Actually, it is the union which has put off any clean-cut decision with "Little Steel" on the closed shop.

## New England Melt Cut Slightly by Holidays

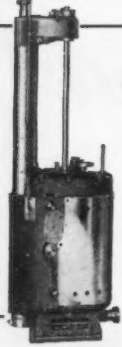
Boston

••• The New England foundry melt this month will be less than in October due to holidays, although there has been a slight pickup in the average daily melt on defense castings. No New England foundry has been obliged to close for lack of iron. At times the Mystic Iron Works' supply of scrap has been skimpy, but not enough so to slow up production.


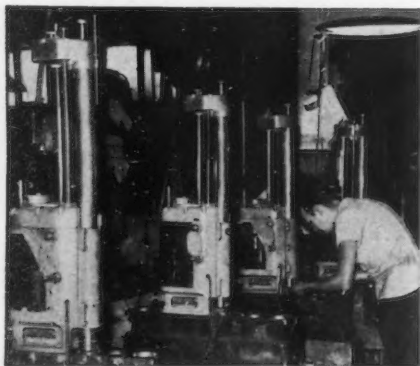
## Alabama Industrialists Elect

Birmingham

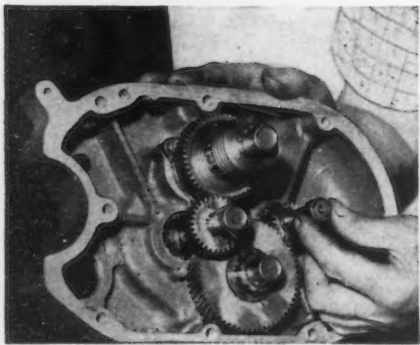
••• Officers for 1942 of Associated Industries of Alabama are to be elected here, Nov. 14, by the association's directors. The association at present is headed by Wallace L. Caldwell, president of the Alabama Asphaltic Limestone Co.



**"30% DEEPER MACHINING"**  
WITH COMPACT, ANTI-FRICTION  
NEEDLE BEARINGS

**1. CYLINDER REBORING MACHINES**, such as these, do a quick, precise job on auto engines. These advantages are achieved largely through the use of anti-friction Torrington Needle Bearings. Says the maker of this "Stormizing" equipment: "The six anti-friction Needle Bearings occupy no more space than plain bushings, yet they permit the machines to make 30% deeper cuts. And they help assure the even flow of power to cutter needed for high speed precision boring."



**2. SMALL, AREN'T THEY**, these high-capacity Needle Bearings on the gear shafts! Compact Needle Bearings can be easily adapted to existing housings, giving dependable anti-friction service while keeping surrounding parts small in size and light in weight. Their hardened steel construction and ample lubricant capacity eliminate the need for frequent attention and provide long bearing life. Installation is very simple, and initial costs, too, are low.

Your product, too, may be improved by the unusual features and economies of the Torrington Needle Bearing. Our Engineering Department will gladly assist you in planning for its use. For full information, write for Catalog No. 104. For Needle Bearings to be used in heavier service, write our affiliate, Bantam Bearings Corporation, South Bend, Indiana, for Booklet 104X.

THE TORRINGTON COMPANY, TORRINGTON, CONN., U. S. A. • ESTABLISHED 1866

Makers of Needle and Ball Bearings

New York Boston Philadelphia Detroit Cleveland Chicago Los Angeles London, England

**TORRINGTON NEEDLE BEARING**



### Ceilings Anticipated on Gray Iron Castings

••• An effort to place price ceilings on gray iron castings may be inaugurated soon on an experimental basis, according to usually well-informed sources in the East and at Washington late last week. Baltimore and Philadelphia may be the first cities where the plan will be tried out.

Prices of these castings have risen, but close followers of the subject have failed to uncover any exorbitant increases. Higher costs of labor and materials and an allowance for reasonable profit which had been lacking in lean years, justified the increases.

In its October bulletin, the Gray Iron Founders' Society, Inc., pointed out that during a boom prices which would yield little, if any, profit in times of restricted output would show considerable returns and that when work fell off prices also fell off where there was no monopoly involved.

### Hawkes Says Closed Shop Will Destroy Private Management

Chicago

••• Private management cannot survive the closed shop in all industry, Albert W. Hawkes, president of the Chamber of Commerce of the United States said here. "It is inevitable that the closed shop will be followed by government operation of industry," Hawkes said, warning that destruction of management and loss to unions of all labor gains of the past 75 years will result if the government does not face the closed shop issue.

### Powder Metallurgy Review Is Revised

••• A revised and enlarged edition of "Powder Metallurgy—a Review of its Literature" is now ready for distribution by the Department of Publications of the Colorado School of Mines. This work, published as Vol. 36, No. 4, of the "Colorado School of Mines Quarterly," is by Clark B. Carpenter, professor and head of the department of metallurgy at the school. Copies may be obtained from the Department of Publications, Colorado School of Mines, Golden, at a cost of 50 cents.

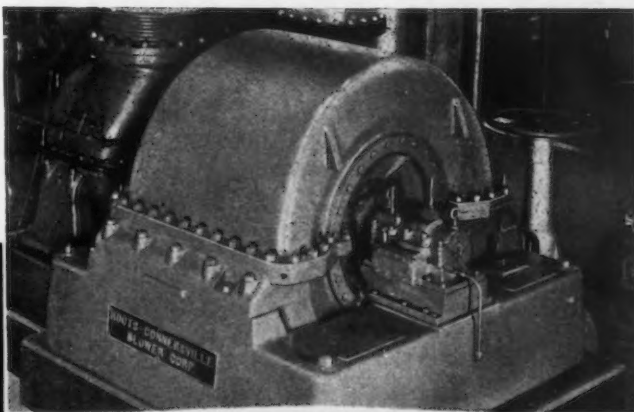
### Metal Office Furniture Output Ordered Cut 40%

Washington

••• Hoping to release 100,000 tons of steel for national defense uses, the Priorities Division of OPM last week ordered the production of metal office furniture and equipment to be curtailed approximately 40 per cent below that of last year and warned that more drastic cuts may be necessary.

The use of steel will be measured by the tonnage contained in finished products, preventing use of large amounts of cut steel now in inventory. Steel tonnage quotas are maximum figures and there is no guarantee that quotas will be reached. By permission of the Director of Priorities, restrictions may be exceeded on orders bearing preference ratings and requiring more steel than is allowed under the curtailment.

This steam turbine driven 24-inch 3-stage centrifugal exhauster of 1,210,000 cu. ft. per hour capacity handles 0.375 specific gravity gas at 4 lbs. pressure in Indiana coke plant.



## CENTRIFUGAL EXHAUSTERS

*for  
Coke Oven  
Service*

Centrifugal Exhausters as built by Roots-Connorsville are backed by years of general air and gas handling experience and many years of specialized engineering experience in the designing and building of centrifugal exhausters for coke oven applications. These modern exhausters meet today's demand for new high levels of sustained production.

In your plant expansion or modernization program, get the benefit of the latest improved designs in centrifugal exhauster construction by consulting Roots-Connorsville Blower Corporation, an organization that is in a position to recommend and deliver the unit that meets your particular need. We build both rotary positive and centrifugal types of equipment.

*Centrifugal Blower and Exhauster Bulletin 120-B-11 may answer important questions for you. Ask for your copy.*



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DETROIT

SAN FRANCISCO  
LOS ANGELES

## SAE Revises Specifications On Aircraft Materials

Detroit

••• Eighteen new aeronautical material specifications have been issued by the Society of Automotive Engineers, effective Nov. 1, and 24 former specifications have been revised. New and revised specifications include aluminum alloy sheet and strip; aluminum alloy sheet and strip, aluminum

covered; aluminum alloy bars, extrusions, castings; wrought magnesium alloy and magnesium alloy sheet and castings; aluminum bronze; beryllium-copper alloy; sheet and strip steel; corrosion resistant sheet and strip steel; corrosion and heat resistant sheet and strip steel; seamless steel tubing, corrosion and heat resistant; welded steel tubing; carburizing steel; spring wire and piston rings.

## SHORT ON SEMI-SKILLED HELP?

*Use the tool with  
BUILT-IN experience*

For high speed assembly of touchy jobs, Millers Falls No. 50 Screw Driver is the ideal tool. Lightweight, fast, versatile—it's equally efficient whether hung by the bail on a suspension spring, clamped in a bench stand with foot treadle, or fixed to a gooseneck stand.

### SENSITIVE AUTOMATIC CLUTCH

Prime feature of No. 50 is its "Adjustomatic" Clutch—exclusive Millers Falls development so sensitive, so perfected that even inexperienced operators work rapidly, setting up screws exactly to the pre-selected tension—without delays, without marring the work.

Cleverly designed switch control minimizes fatigue. (Rapid Reversing Switch optional.)

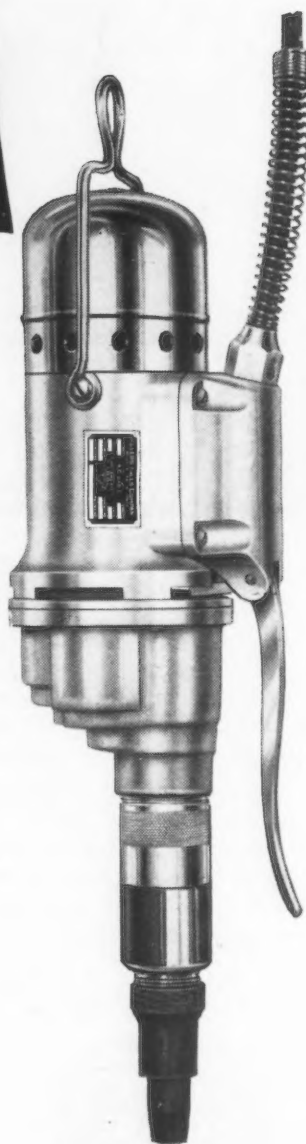
**SPECIFICATIONS:** No. 50 — Weight 4¾ lbs., 12½" overall; drives #12 machine screws, #10 1-1/3" wood screws; speeds 8, 12, 20, 30 hundred r.p.m.; amps., full load, 1.2; Universal AC or DC motor, 25 to 60 cycle.

No. 51—with side handle and locking trigger switch; 5 lbs.

No. 52 — streamlined for close quarters; toggle switch; 4½ lbs.

HAVE US ARRANGE A FREE TRIAL ON  
YOUR OWN WORK—NO OBLIGATION

**MILLERS FALLS COMPANY**  
**GREENFIELD**  **MASSACHUSETTS**



Millers Falls Electric  
Screw Driver No. 50

## Quick Delivery Obtained On 15 Cars of Sheets

••• An inquiry from the Army Transport Service for 15 cars of sheet steel, hot rolled and galvanized, was placed speedily at New York last week end. Mills were able to offer fairly quick delivery. One who offered 9 weeks' shipment was told earlier delivery had been obtained.

Small stocks of sheets and other types of steel are being offered regularly by brokers, to the mystification of many persons who are wondering where the supplies are obtained. In some cases high prices are sought; in other instances prices are reasonable. Small lots of prime hot rolled pickled and oiled 7 to 9-gage sheets size 8-in. by 120-in. were offered several weeks ago at 6¢ per lb. f.o.b. Detroit; 20-gage cold rolled, all size 67-in. by 83-in., at \$9.90 per 100 lbs. f.o.b. Buffalo; up to 2000 tons of rail steel bars from ¾-in. to 1-in. at \$4.50 per 100 lbs. f.a.s., New York, on three to four weeks' delivery; 500 tons mild steel plates 3 ft. and up, cut lengths, 0.177-in. to 1-in. thicknesses at \$5.75 per 100 lbs. f.a.s., New York, immediate delivery.

Stocking-up on the part of builders has been noticeable since OPM announced a curtailment of construction.

## Cellophane Ban Includes Hardware and Metals

Washington

••• Transparent materials such as cellophane were banned last Friday by OPM from future use in packaging, etc., in the hardware and metals industries. Further studies are being made by the Division of Civilian Supply with a view to extending the curtailment to the packaging of food and tobacco products.

## Carbon Plant Announced

Chicago

••• The Great Lakes Carbon Corp. plans for the immediate erection of a calcined carbon plant here at an estimated cost of \$500,000. The plant will occupy an area of approximately seven acres on the eighteen-acre tract purchased from the Calumet Western Railway Co.



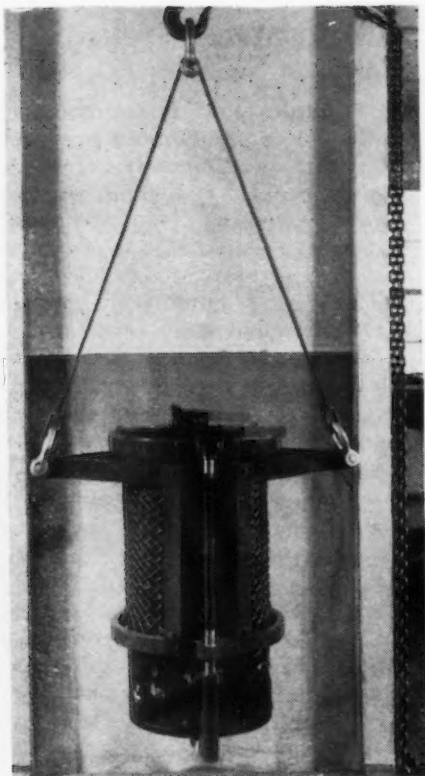


Photo by Hurric & Ewing

**SHELL CARRIER:** The grip of the wire mesh in the shell carrier shown above is said by the manufacturer to be strong enough to hold a 16-in. shell.

## Data Called for From Pittsburgh Primes

Pittsburgh

••• Approximately 100 prime contractors in this district have been contacted for up-to-date information regarding items which they wish to subcontract, according to C. E. Robinson, deputy manager division of contract distribution.

These prime contractors have been asked the following information: the name of the individual within the prime contractor's plant to be contacted, a list of the items on which outside assistance is needed, the facilities involved as to size and type to do the work on the item required, the type and grade of material to be worked, general tolerance limits, quantity and rate of production.

This information, together with current subcontracting opportunities available at the local office, will be furnished to companies or their representatives who have received tickets of admission to the Defense Special Clinic Train.

## Training Films Prepared By South Bend Lathe

South Bend, Ind.

••• To speed up the training of lathe operators for national defense industries, the South Bend Lathe Works has sponsored the production of a series of 16 mm. sound motion pictures in color based on the book "How to Run a Lathe." Professionally filmed by Burton Holmes Films, Inc., these

pictures show practical shop methods as practised in modern industrial plants. Showing time for the two 800 ft. reels is approximately 20 min. each.

The first reel entitled "The Lathe" shows the apprentice what a lathe is, what it is for, and how the various parts operate. The second reel, "Plain Turning," shows in detail each operation performed in the machining of a straight cylindrical shaft between the lathe centers.

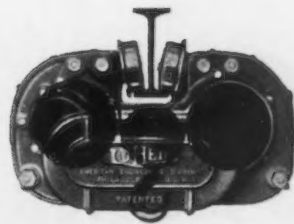


## AMERICAN ENGINEERING COMPANY

The Lo-Hed Hoist Is Applicable To Any Monorail System. There's A Balanced Lo-Hed Electric Hoist For Every Purpose

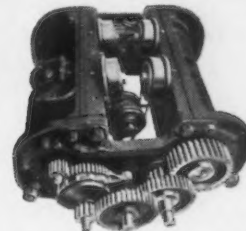
OTHER A-E-CO PRODUCTS: TAYLOR STOKERS, MARINE DECK AUXILIARIES, HELE-SHAW FLUID POWER

Look in your Classified Telephone Directory under "A-E-CO LO-HED HOISTS" for your nearest representative.



## BALANCE IS IMPORTANT IN HOISTS

**LO-HED the Balanced Hoist.** You'll recognize a Lo-Hed hoist at first sight—it looks different. The reason for this difference is dollar-important to you. Take a look at the picture above. See how motor and drum are arranged about the beam. Logical, isn't it? Motor and drum are parallel, connected by efficient spur gears. Note carefully how the hook can be pulled up close to the beam—no headroom wasted. Best of all, the efficiency, durability and accessibility of a Lo-Hed hoist are reflected in low operating and low maintenance costs. Write for Lo-Hed catalog today.



## LOOK AT THE BALANCED LO-HED!

**It Costs Less To Operate**—All gears are efficient stub-tooth spur gears running in a sealed oil bath . . . gear shafts and trolley wheels are equipped with heavy-duty ball or roller bearings.

**It Costs Less To Maintain**—Sturdy construction . . . seldom, if ever, requires removal from rail . . . covers of controller, motor drum, gearing easily removed.

**It's Safe**—Factor of safety of over 5 at full capacity . . . 100% Positive Automatic Stop when load reaches upper limit . . . Automatic Holding Brake prevents load drifting when current is shut off . . . short, strong shafts minimize torsional stresses.

**It's Protected**—Controller is fire, dust and moisture proof . . . motor totally enclosed . . . gearing sealed in . . . motor and drum covered by easily removable covers.

## AMERICAN ENGINEERING CO.

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☐ Please send me your complete catalog of LO-HED HOISTS.

☐ Ask your representative to get in touch with me promptly.

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Company .....

Street Address .....

City..... State.....

(Please print plainly)

### Form Society to Promote Industrial Radiography

••• Formation of the American Industrial Radium & X-Ray Society has been announced by Philip D. Johnson, Radium Chemical Co., New York. The society held its first annual and organization meeting recently at the Massachusetts Institute of Technology, Cambridge, Mass., and was addressed by Charles W. Briggs, of the Steel

Founders Society of America, who spoke on "Developments in Gamma Ray Radiography, 1828-1941."

The aim of the society is to promote scientific education in the field of industrial radiography. Officers are: President, C. G. Lutts, Navy Yard, Boston; vice-president, J. J. Cavanagh, Navy Yard, Boston, and treasurer, J. A. Catanzano, General Electric Co., Lynn, Mass. Headquarters of the group is at 25 East Washington Street, Chicago.

### Steel Employment Off Slightly in September

••• Employment in the steel industry during September averaged 652,000 men, or slightly below the August peak of 654,000, according to the American Iron and Steel Institute. The decline was the first in 17 months, and reflects shifting of demand from certain highly-finished steel products requiring large amount of labor to relatively greater production of plates, shapes and other products needing proportionately less labor.

Except for the August record, the number of men employed in September is the highest on record for the steel industry. In September a year ago, 565,000 men were at work. Steel payrolls in September totaled \$110,392,000, compared with \$112,757,000 in payrolls during August, a longer month. In September 1940, steel industry payrolls amounted to \$82,068,000.

Wage-earning employees of the industry earned an average of 98.2c. per hour during September, as against 98.5c. in August and 85.4c. in September last year.

An average of 37.8 hr. per week was worked by wage earners in September, compared with 37.2 hr. per week in August and 36.5 hr. per week in September, 1940.

### Index of Waste Prices Shows Rise Since 1939

••• The Bureau of Labor Statistics has announced a series of index numbers showing changes in market prices for waste and scrap materials by weeks from Jan. 7, 1939, to date. Forty-four waste and scrap materials are included. The bureau said "at the present time these materials are quoted at prices averaging 65½ per cent above those prevailing at the outbreak of war, and for the week ended Oct. 25, 1941, the index was 165.5 per cent of the August, 1939, average." For the week ended Oct. 25, 1941, the iron and steel scrap index was 134.0, unchanged since May 17, 1941.

The quotations used are those published in trade journals. For certain materials "sales are reported to have been made at slightly higher prices," the Oct. 29 release said.

## 3 Million 100-Pound Bombs could have been made of the steel RODINE saved!

Steel is vital to National Defense . . . steel and more steel! Rodine saved steel enough last year to have made 3,000,000 one-hundred-pound bombs . . . steel otherwise lost by acid attack in pickling baths. This amazing record of steel conservation was made possible by the unique qualities of Rodine—saving acid, labor, time, reducing brittleness, blistering, corro-

sion; eliminating formation and escape of fumes. American Chemical Paint Company specializes in chemicals to save steel . . . has adequate stocks on hand to meet your needs. ACP's 20 years' experience is helping to solve the production problems of America. Rodine—and other ACP products—may be your solution. Write for Bulletin No. 13.



## AMERICAN CHEMICAL PAINT CO.

MAIN OFFICE AND WORKS  
AMBLER . . . PENNA.



DETROIT, MICH. 6339 Palmer Ave., E.  
CANADIAN BRANCH  
WALKERVILLE ONT.



## Mediation Board 9 to 2 Against The Closed Shop

Washington

•••The surprising and overwhelming vote of 9 to 2 by the National Defense Mediation Board against the closed shop in steel-owned captive mines was accepted as a newly adopted government policy not to permit organized labor any longer to interrupt defense production with strikes. Should CIO President John L. Lewis of the United Mine Workers decline to abide by this rejection of his demand for the closed shop in captive mines, indications are that the government will take firm action to keep the mines open. This is based on the decision of the board after it had been requested by President Roosevelt to make a specific recommendation in the reopened case.

Previously the board made no recommendation one way or the other and on this occasion it recommended that the United Mine Workers and operators proceed immediately to sign the Appalachian agreement, with the reservation that the agreement which requires membership in the union as a condition of employment shall be inoperative. That means that the board voted that union membership is not a condition of employment.

What made the vote especially striking is the fact that the two votes for the closed shop were cast by two members of the union, SWOC President Philip Murray and Secretary-Treasurer Thomas Kennedy of the mine workers' union. Emphasizing the vote was

the further fact that both AFL members of the board joined the three public and four employer members in rejecting the Lewis demand. It had been assumed that the AFL members would join the CIO members in voting for the closed shop.

The vote covered the most vital issue yet coming before the board and puts the government on record against the closed shop. It is consequently expected that it definitely puts a damper on a drive to enforce the closed shop in the steel industry.

When Chairman Davis of the board was asked what action would be taken to enforce the decision, should action be necessary, he said he hoped that the next step is the acceptance of the decision. Asked what would be done in the event Lewis calls a strike, Davis said:

"I'll cross the bridge when I come to it."

By coincidence or design the board decision was announced on the eve of the OPM meeting of the iron and steel industry in Washington to which the President sent a message saying that no greater burden has ever been thrown on a single industry.

## Fleetwings Not a Subsidiary

•••Fleetwings, Inc., was incorrectly described as a subsidiary of the Edward G. Budd Mfg. Co. in the article "stainless steel" published on page 93 of the Nov. 6 issue of THE IRON AGE. There is no connection between Fleetwings and Budd, other than the fact that both have been active in the development of stainless use in aircraft construction.

## Tool Rebuilders Get A-1-c Preference Rating

Washington

•••Machine tool rebuilders have been granted a preference rating of A-1-c for use in acquiring scarce materials needed to make deliveries of tools to fill defense orders. A rating of A-10 was assigned to purchase orders for rebuilt machine tools placed by a manufacturer to enable him to fill existing orders, unless a higher rating had been given previously.

Execution of the acceptance of the rating order and filing it with the Priorities Division, furnishing one copy to the supplier is the procedure to be followed in applying the rating. Materials to which the rating may be assigned are: steel, brass, and bronze castings, alloy and carbon steels in bars, brass, copper and steel tubing and fittings, bearing metals, forgings, castings, shapes and tubes, measuring instruments and gages, cutting tools including cement carbides, motors and other electrical accessories, anti-friction bearings, machine parts and accessories.

Rebuilders are defined as those who rework or replace worn or missing parts, test the repaired tool under power and guarantee its performance for a period of not less than 30 days.

## Robinson Appointed

Washington

•••James Gordon Robinson has been appointed Administrative Officer in the OPM. He succeeds Ray Jackson, who, it was announced, has resigned to enter private business.

**1000 TANKS IN 6 WEEKS:** On Aug. 2, the American Car & Foundry Co., delivered its 1000th light combat tank to the U. S. Army and on Oct. 21, it delivered the 2000th tank. About 2000 tons of armor plate a month are made for these tanks in the company's largest plant in the world for the manufacture of case-carburized armor plate. Orders for more than 5800 tanks for the Army and large quantities of tanks and parts for Britain are now on schedule.



## Task is Gigantic, Steel Leaders Told

Washington

• • • No greater burden has ever been thrown on any industry than the steel industry faces in the current national emergency, said a message from President Roosevelt at the OPM meeting here Tuesday with the entire iron and steel industry. No selfish labor or management interest should be permitted to interfere with the gigantic task, he continued, asserting he was positive labor would work with management.

The message was read by OPM Director General William S. Knudsen.

"No greater call has ever been made on any industrial group than is required of the steel industry," he said. "The initiative, the energy and the resourcefulness of every man in every capacity from the senior executives through every type of labor must concentrate upon these objectives, primary of which, of course, are the requirements of our Army, our Navy and our Maritime Commission.

"We must set aside any individualistic interest which interferes in the slightest degree with this objective. The executives must, and I know they will, work with labor to meet this test of their resources, and I am equally as posi-

tive that labor will work with the executives, for that purpose is mutual—the protection of the lives and the homes of the American people and of every free home on earth."

It was estimated 700 steel representatives attended the session.

E. G. Grace of Bethlehem Steel Co. replied to President Roosevelt's message on behalf of the steel industry. Addressing his audience as "fellow puddlers," Mr. Grace said that he was glad the President spoke as he did. The Bethlehem head then, as a matter of emphasis, read the paragraph in the President's message calling for cooperation between industry and labor. Mr. Grace said the steel industry shares that desire and that what the President wants is just what the industry will do.

He said the defense job will be determined by the "tools we have, and how they are manned."

The United States, England and Russia, it was stated, have an annual capacity of 130,000,000 tons of steel, this country having 88,000,000 tons, which is being expanded.

When Germany was building its great war machine from 1934 to 1938, Mr. Grace said, it produced 90,000,000 tons of steel. In the past 18 months, the United States, Mr. Grace said, produced 120,000,000 tons of steel.

Mr. Grace sounded the keynote of the meeting when, directing his remarks to A. D. Whiteside, who presided, he said that the industry wants to know "what you need and when you need it."

Mr. Grace said there are two fundamental things for Washington to arrange for, allocation and production, so that the industry can serve its four customers—Army, Navy, Maritime Commission and Lend-Lease requirements. It was pointed out that there may be a lack of finishing facilities in instances but that they can be provided for in the expansion program. The whole thing, he said, must be centralized in and directed from Washington.

OPM Priorities Director Donald M. Nelson asked for the greatest speed in production.

England and Russia are not satisfied with the aid they are getting from the steel industry, the conference was told by W. L. Batt, head of the OPM materials division, who recently returned from a five-week trip to those countries. He said much more steel is needed for defense than was realized a few months ago.

"No group in the whole economy has acted better about price control than the basic steel producers," the industry was told by Leon Henderson. He stated that any difficulty in steel comes from trades and brokers handling the steel after it leaves the mills. Mr. Henderson expressed hope that the price control bill will be "strengthened by the restoration of three of four provisions" that were in the bill when it was originally introduced. Particular objection has been made by OPA to the elimination of licensing provisions.

In an outline of Maritime Commission aims in steel relations, Admiral Land, chairman, said results were in general unsatisfactory in the attempts of the commission and OPM to get necessary steel, and that the industry should be more cooperative out of gratitude for the favors received in the form of opposition by the commission to things which were in disfavor in the industry. He mentioned specifically increases in new steel facilities, and the "famous pipeline proposal" which he said was poorly timed.

**FLYING BATTLESHIP:** The Mars, new flying boat built at the Martin plant at Baltimore for the Navy, has the gasoline capacity of a railroad tank car and an interior space equal to that of a 10-room house. This is the first airplane to be launched with the full naval ceremony hitherto reserved for battleships.

Photo by Wide World





## SWOC Drive Seen After Convention

Chicago

••• A formal demand for the closed shop and check-off in all plants of United States Steel Corp. may be made by SWOC after the national CIO convention starting in Detroit, Nov. 17. THE IRON AGE has learned that no change has been made in the ultimate union goal—and that the quiet which has reigned in steel for the past several weeks was “planned that way” until the national convention is over.

National SWOC officers insist events at the convention will have no bearing on plans for organizing steel 100 per cent, but the convention floor will see hectic action. Phil Murray, national CIO head, has said he will not accept another term as president of CIO if much opposition to him is evident. Murray never did want the national leadership but only accepted it in the interest of harmony.

Though most of the CIO affiliates have made it clear their support will go to Murray, there is a strong faction backing Lewis. The fight, if one develops, will be, strangely, on the administration's foreign policy. Lewis is ardently opposed to this policy and Murray and most CIO leaders are just as actively for it. If Lewis can muster enough support, a fight may develop which would cause Murray to refuse to accept a second term. This is something the CIO wants to avoid, and one leader told THE IRON AGE that inner forces have been working to the point where Lewis may surprise the rank and file delegates by personally nominating Murray.

Sidney Hillman, in charge of labor for OPM and one of the CIO's charter leaders, will receive a frigid reception in Detroit and actually refused his usual place in the inner circle.

SWOC demands after the convention will also include a request for a stiff wage increase, it is believed. Some steel companies negotiating with the union have already indicated willingness to grant the wage increase but are traditionally holding out on the check-off.



**PRODUCTION SOLDIERS:** With much emphasis being placed on expansion of steel plants, these five men, pictured at a meeting of the Pittsburgh section of the Association of Iron & Steel Engineers, are working to expand production from existing equipment. All spoke at the meeting. From left to right they are F. C. Swartz, openhearth superintendent, Carnegie-Illinois Steel Corp., Youngstown; L. E. Riddle, blast furnace superintendent, Carnegie-Illinois Steel, Duquesne, Pa.; W. T. Brown, research engineer, Jones & Laughlin Steel Corp., Pittsburgh; L. P. Lias, plant metallurgist, J. & L.; Joseph Malborn, United Engineering & Foundry Co., Pittsburgh.

## NAM Questions Steel Expansion

••• In a new study of the steel expansion problem, the National Association of Manufacturers points to fallacies and indefinite concepts on the part of proponents of greater capacity, and indicates a serious problem of adjustment to post-war needs may arise if the proposed steel capacity of 99,000,000 tons becomes an actuality.

The 70-page report examines current steel supplies, the industry's capacity, estimated defense demands and peace-time needs from many angles.

OPM's estimate of 16,000,000 tons of ingots as probable requirements of railroads in 1942 is declared suspect to the extent of 5,000,000 tons or 50 per cent of the Hauck expansion program.

While some further expansion may be needed, the report says a too great and too rapid expansion of facilities may present three serious problems: it may retard defense; it may unduly restrict civilian consumption, and it may lead to excess capacity in the post-armament period.

Among highlights of the study are the following:

“The SPAB decision favoring 10,000,000 tons expansion appears difficult to understand because the record output of the industry, the leading position of United States in world steel production and the

available data of overall steel requirements do not indicate a need for expansion on a large scale.

“Each month schedules of leading steelmakers indicate steel output is falling under priorities in ever-increasing proportions; for instance, in September, 50 to 60 per cent fell under priorities, in October, 70 to 75 per cent, while direct defense and export requirements in 1941 only total about 25 per cent of steel shipments.

“Apparent tightness in steel supplies to civilian consumption is due to: inflated demand for consumers' durable goods such as automobiles and refrigerators, demand for long-needed replacements and additions to plant facilities, ‘protective’ buying leading to inventory hoarding, shifts in steel demand under emergency conditions, bottlenecks in certain finishing facilities, and unutilized capacity.

“Failure to obtain full utilization of existing capacity is due to: the shortage of scrap, operation of priorities, strikes, prejudice against Bessemer steel, and substitute of steel for other scarce and critical materials.

“The shortage of scrap has been, to a large extent, responsible for the failure to attain capacity levels. This shortage has been due to three factors: the unprecedented demand for scrap under emergency conditions, depletion of stocks through excessive exports in the past, and pricing policies of the OPA.”

## Steel Output Hits New High in October

• • • Production of steel ingots in October exceeded all previous monthly records by a substantial tonnage, according to the American Iron and Steel Institute. A total of 7,242,683 net tons of steel ingots and castings was produced, which brought total output for the 10 months of this year nearly 2,000,000 tons above production in the full twelve months of 1940.

Steel production in September

amounted to 6,819,706 tons, while 6,644,542 tons were produced in October a year ago. Prior to last month, the record monthly production of steel was 7,131,641 tons, produced in March, 1941.

In establishing the new record in October, the steel industry operated at an average of 99.0 per cent of capacity, rated as of June 30. Open hearth steel production,

totaling 6,427,977 tons, represented 99.4 per cent of capacity, output of 532,863 tons of Bessemer steel was 92.3 per cent of capacity, and production of 281,843 tons of electric furnace steel represented 101.4 per cent of capacity. The October tonnages of both open hearth and electric furnace steels represented new peaks of production, while the output of Bessemer steel was the highest in a decade.

	STEEL INGOT OUTPUT IN NET TONS					PER CENT OF CAPACITY			
	Open Hearth	Bessemer	Electric	Total	Weekly Output	Open Hearth	Bessemer	Electric	Total
<b>1940</b>									
January	5,356,444	285,447	122,832	5,764,723	1,301,292	85.7	56.1	77.0	83.4
February	4,208,249	205,458	112,090	4,525,797	1,093,188	72.1	43.2	75.2	70.0
March	4,078,843	191,568	118,772	4,389,183	990,786	65.3	37.6	74.5	63.5
<b>1st Quarter</b>	<b>13,643,536</b>	<b>682,473</b>	<b>353,694</b>	<b>14,679,703</b>	<b>1,129,208</b>	<b>74.4</b>	<b>45.7</b>	<b>75.6</b>	<b>72.3</b>
April	3,808,031	176,419	116,024	4,100,474	955,821	62.9	35.8	75.1	61.2
May	4,593,771	258,741	125,270	4,967,782	1,121,395	73.4	50.8	78.5	71.8
June	5,222,120	305,115	130,208	5,657,443	1,318,751	86.3	61.9	84.3	84.5
<b>2nd Quarter</b>	<b>13,613,922</b>	<b>740,275</b>	<b>371,502</b>	<b>14,725,699</b>	<b>1,131,875</b>	<b>74.2</b>	<b>49.5</b>	<b>79.3</b>	<b>72.5</b>
<b>1st 6 months</b>	<b>27,257,458</b>	<b>1,422,748</b>	<b>725,196</b>	<b>29,405,402</b>	<b>1,130,542</b>	<b>74.3</b>	<b>47.6</b>	<b>77.4</b>	<b>72.4</b>
July	5,269,701	322,567	132,357	5,724,625	1,295,164	84.5	63.5	83.2	83.0
August	5,670,932	369,770	145,681	6,186,383	1,396,475	90.8	72.6	91.3	89.5
September	5,535,198	365,289	155,759	6,056,246	1,415,011	91.7	74.2	101.1	90.6
<b>3rd Quarter</b>	<b>16,475,831</b>	<b>1,057,626</b>	<b>433,797</b>	<b>17,967,254</b>	<b>1,368,412</b>	<b>89.0</b>	<b>70.1</b>	<b>91.7</b>	<b>87.7</b>
<b>9 months</b>	<b>43,733,289</b>	<b>2,480,374</b>	<b>1,158,993</b>	<b>47,372,656</b>	<b>1,210,339</b>	<b>79.2</b>	<b>55.1</b>	<b>82.2</b>	<b>77.5</b>
October	6,059,792	408,317	176,433	6,644,542	1,499,897	97.0	80.2	110.6	96.1
November	5,872,162	420,448	176,497	6,469,107	1,507,950	97.1	85.3	114.2	96.6
December	5,907,840	399,434	188,083	6,495,357	1,469,538	94.8	78.6	118.2	94.1
<b>4th Quarter</b>	<b>17,839,794</b>	<b>1,228,199</b>	<b>541,013</b>	<b>19,609,006</b>	<b>1,492,314</b>	<b>96.3</b>	<b>81.3</b>	<b>114.3</b>	<b>95.6</b>
<b>Total</b>	<b>61,573,083</b>	<b>3,708,573</b>	<b>1,700,006</b>	<b>66,981,662</b>	<b>1,281,210</b>	<b>83.5</b>	<b>61.7</b>	<b>90.3</b>	<b>82.1</b>
<b>1941</b>									
January	6,271,862	451,637	205,256	6,928,755	1,564,053	99.0	76.0	93.4	96.9
February	5,673,289	378,330	186,281	6,237,900	1,559,475	99.2	70.5	93.9	96.6
March	6,461,936	460,169	209,536	7,131,641	1,609,851	102.0	77.4	95.4	99.7
<b>1st Quarter</b>	<b>18,407,087</b>	<b>1,290,136</b>	<b>601,073</b>	<b>20,298,296</b>	<b>1,578,406</b>	<b>100.1</b>	<b>74.8</b>	<b>94.2</b>	<b>97.8</b>
April	6,130,638	395,009	232,081	6,757,728	1,575,228	99.9	68.6	109.1	97.6
May	6,360,211	444,361	250,560	7,101,759	1,592,581	100.4	74.8	114.0	98.7
June	6,103,767	458,242	238,721	6,800,730	1,585,252	99.5	79.6	112.2	98.2
<b>2nd Quarter</b>	<b>18,594,616</b>	<b>1,297,612</b>	<b>721,362</b>	<b>20,613,590</b>	<b>1,584,442</b>	<b>100.0</b>	<b>74.3</b>	<b>109.8</b>	<b>98.2</b>
<b>1st 6 months</b>	<b>37,001,703</b>	<b>2,587,748</b>	<b>1,322,435</b>	<b>40,911,886</b>	<b>1,581,441</b>	<b>100.1</b>	<b>74.5</b>	<b>101.6</b>	<b>98.0</b>
July	6,039,859	489,239	242,584	6,821,682	1,543,367	94.4	85.0	87.4	93.4
August	6,243,100	495,523	262,334	7,000,957	1,580,351	96.6	85.9	94.4	95.7
September	6,058,731	500,687	260,288	6,819,706	1,593,389	97.0	89.8	96.9	96.4
<b>3rd Quarter</b>	<b>18,391,690</b>	<b>1,485,449</b>	<b>765,206</b>	<b>20,642,345</b>	<b>1,572,151</b>	<b>96.0</b>	<b>86.8</b>	<b>92.9</b>	<b>95.2</b>
<b>9 months</b>	<b>55,408,224</b>	<b>4,073,197</b>	<b>2,069,467</b>	<b>61,550,888</b>	<b>1,578,228</b>	<b>98.7</b>	<b>78.6</b>	<b>98.2</b>	<b>97.0</b>
October	6,427,977	532,863	281,843	7,242,683	1,634,917	99.4	92.3	101.4	99.0

Source: American Iron and Steel Institute. Data based on reports by companies which in 1940 produced 98.43 per cent of open hearth, 100 per cent of bessemer and 85.82 per cent of electric ingots and steel for castings. Annual capacity, as of Dec. 31, calculated as follows: 1940, open hearth 73,721,592 net tons, bessemer 6,009,920 tons, electric 1,882,630 tons; 1941, to and including June, open hearth 74,565,510 tons, bessemer 6,996,520 tons, electric 2,586,320 tons; beginning July, 1941, open hearth 76,079,130 tons, bessemer 6,793,400 tons, electric 3,272,370 tons, total 86,144,900 tons.

### Stove Covers to Be Hit

Washington

• • • Estimated to save only about 2500 tons of steel annually, the utility and attractiveness of domestic cooking ranges will be hit by an OPA-OPM request that manufacturers eliminate steel cover lids by Dec. 15.

### Calibration Requests Over 800 per Month

Washington

• • • Requests reaching the National Bureau of Standards for the calibration of high precision end gages requisite for production of

interchangeable parts for automobile, airplane, and other vital military equipment average more than 800 per month, according to the Commerce Department. Calibration is now performed by a ruling machine developed by the Bureau for graduating meter bars in terms of light waves.



## Government Awards . . .

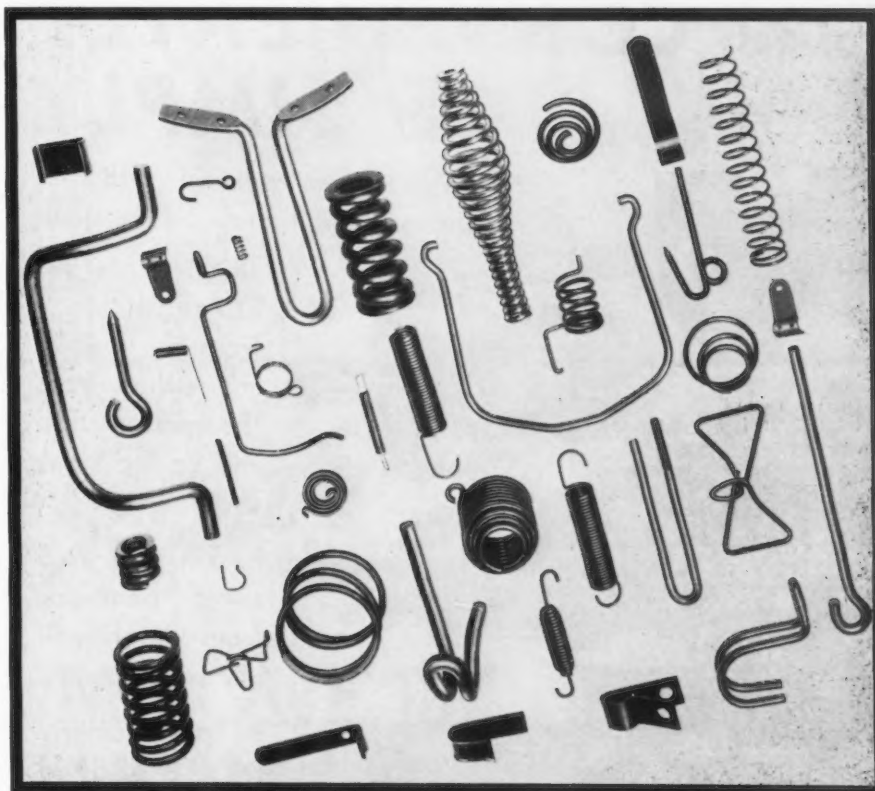
### War Dept., Ordnance:

Ace Drill Co., Detroit; twist drills	\$1,512
Albertson & Co., Inc., Sioux City, Iowa; refacer, valve resurfacing	9,950
Allegheny Ludlum Steel Corp., Brackenridge, Pa.; gages	11,115
steel	33,804
Allis-Chalmers Mfg. Co., Milwaukee; tractors & angle dozers	4,773
Aluminum Co. of America, Washington; ingots, aluminum alloy	6,750
Alvord-Polk Tool Co., Millersburg, Pa.; end mills	1,110
American Air Filter Co., Inc., Louisville, Ky.; dust collecting systems	4,270
American Bridge Co., Inc., New York; steel roof trusses	6,425
American Cutter & Engineering Co., Detroit; gages	1,201
American Locomotive Co., New York; springs, steel	67,707
American Manganese Bronze Co., Holmesburg, Philadelphia; bronze manganese	1,598
American Type Founders, Inc., Elizabeth, N. J.; recoil mechanisms and spare parts	659,649
American Welding & Mfg. Co., Warren, Ohio; welded rings	1,316
Ampco Metal, Inc., Milwaukee; castings	1,971
Arrow Tool & Reamer Co., Detroit; end mill cutters	1,706
Barwood & Co., Philadelphia; gages	9,469
Bethlehem Steel Co., Bethlehem, Pa.; carbon, steel	4,000
bombs	1,281
Bliss & Laughlin, Inc., Buffalo; steel	1,623
Bridgeport Brass Co., Bridgeport, Conn.; brass	19,387
Bridgeport Machines, Inc., Bridgeport, Conn.; milling machines	1,020
Bristol Brass Corp., Bristol, Conn.; brass rods	71,981
Cape Ann Tool Co., Pigeon Cove, Mass.; steel forgings	9,795
Carboloy Co., Inc., Detroit; dies	1,710
Carborundum Co., Chicago; grinding wheels	1,295
Carnegie-Illinois Steel Corp., South Chicago; steel	11,025
Carpenter Steel Co., Philadelphia; drill rod	1,541
Caterpillar Tractor Co., Peoria, Ill.; tractors	66,230
cranes	495,107
Chase Brass & Copper Co., Inc., Waterbury, Conn.; cartridge cases	416,250
Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati; grinders	59,883
Cleveland Twist Drill Co., Cleveland; twist drills, reamers & end mills	69,835
tools	207,767
Colonial Broach Co., Detroit; broaches	17,715
Colt's Patent Fire Arms Mfg. Co., Hartford; spacers, back plate trigger	4,000
machine gun barrels	17,472
parts for pistols	30,495
Columbia Steel & Shafting Co., Pittsburgh; steel	1,143
Conco Engineering Works, Mendota, Ill.; cranes	11,350
Continental Motors Corp., Muskegon, Mich.; governor assemblies, with gear & linkage	1,085
Detroit Broach Co., Inc., Detroit; details, broach section	3,081
D. M. Dillon Steam Boiler Works, Inc., Fitchburg, Mass.; steel furnace shells	12,063
Dole Valve Co., Chicago; primer pumps	2,325

Edgecomb Steel Co., Philadelphia; steel	30,624
Emeis Electrical Service, Davenport, Iowa; swivel connectors & nuts	1,207
Ex-Cell-O Corp., Continental Tool Works, Division, Detroit; broaches	14,925
reamers	29,460
Federal Screw Works, Detroit; boosters	466,000

Federal Tool Corp., Chicago; gages	3,238
Firth-Sterling Steel Co., Philadelphia; dies	1,379
Gas-Weld Equipment Co., Boston; plumbing equipment	1,151
General Electric Co., Schenectady; comparers, spot weld	1,003
General Electric Co., Erie, Pa.; howitzers	885,699
General Motors Sales Corp., New Departure Division, Bristol, Conn.; ball bearings	2,012
Genesee Tool Co., Fenton, Mich.; tools	4,267
Goodman Mfg. Co., Chicago; guides for mfr. of recoil mechanisms	123,200

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Graybar Electric Co., Albany, N. Y.; distributing duct .....	3,099
Great Lakes Steel Corp., Ecorse, Detroit; steel .....	17,152
Greenfield Tap & Die Corp., Greenfield, Mass.; taps, dies & die-stocks .....	12,138
gages .....	9,176
Guiberson Diesel Engine Co., Chicago; parts for tanks .....	85,052
Haarmann Steel Co., Holyoke, Mass.; steel .....	2,330
Hall Mfg. Co., Toledo, Ohio; grinders .....	12,966
Hanson-Van Winkle-Munning Co., Matawan, N. J.; tools .....	1,305
Louis Hansen's Sons, Davenport, Iowa; pliers .....	7,776

Harnischfeger Corp., Boston; cranes .....	1,317
Hartford Electric Steel Corp., Roxbury, Mass.; steel castings .....	5,652
Hendey Machine Co., Torrington, Conn.; crank shapers .....	86,802
Hercules Powder Co., Kenil, N. J.; gages .....	1,490
Hersey Mfg. Co., S. Boston; adapters .....	1,317
Illinois Tool Works, Chicago; cutters .....	1,059
E. Ingraham Co., Bristol, Conn.; plates for fuzes .....	1,750
International Harvester Co., Chicago; gun carriages .....	2,476,875

International Nickel Co., New York; copper nickel alloy rods, piston rods .....	10,235
.....	17,441
J. C. H. Automatic Machine Works, Philadelphia; inserts, for drivers .....	1,387
B. Jahn Mfg. Co., New Britain, Conn.; punches and dies .....	6,452
Jones & Lamson Machine Co., Springfield, Vt.; stamping blocks and chip guards .....	1,890
Jones & Laughlin Steel Corp., Pittsburgh; steel .....	4,156
Kensington Steel Co., Chicago; steel tank tracks .....	239,496
W. B. Knight Machinery Co., St. Louis; milling machines .....	19,965
Landis Machine Co., Waynesboro, Pa.; tools .....	105,171
C. W. Lauman & Co., Long Island City, N. Y.; casement well .....	10,880
R. K. LeBlond Machine Tool Co., Cincinnati; lathes & equipment .....	16,325
Lehigh Foundries, Inc., Easton, Pa.; ammunition parts .....	84,150
Lincoln Park Tool & Gage Co., Lincoln Park, Mich.; gages .....	5,594
Lincoln Tool & Die Co., Detroit; fixtures .....	1,192
dies .....	2,352
Link Belt Co., Chicago; gun mounts .....	349,800
Lukens Steel Co., Coatesville, Pa.; steel .....	1,113
Machinery Mfg. Co., Los Angeles; milling machines .....	11,447
Mack Mfg. Corp., New Brunswick, N. J.; gages .....	56,710
McKinney Mfg. Co., Pittsburgh; assemblies, strap hinge; & group, latch .....	1,763
McReynolds Die & Tool Co., Detroit; dies .....	2,920
Merz Engineering Co., Indianapolis; gages .....	4,141
Michigan Tool Co., Detroit; cutting tools .....	3,197
Micromatic Hone Corp., Detroit; honing equipment .....	4,308
Midvale Co., Nicetown, Philadelphia; forgings .....	9,065
suspension rods .....	2,548
Miller & Van Winkle, Inc., Paterson, N. J.; steel springs .....	2,560
Modern Collet & Machine Co., Ecorse, Detroit; arbors .....	3,603
Modern Tool & Die Co., Philadelphia; gages .....	14,566
Monarch Machine Tool Co., Sidney, Ohio; machine tools .....	84,189
Morse Twist Drill & Machine Co., New Bedford, Mass.; counterbores .....	1,595
Muncie Gear Works, Muncie, Ind.; parts & assemblies for gun carriages .....	68,000
Munitions Mfg. Corp., Poughkeepsie, N. Y.; guns .....	9,300,000
Neff Kohlbusch & Bissell, Chicago; machines, milling & centering .....	20,322
Niles-Bement-Pond Co., Pratt & Whitney Division, Hartford; machines, precision locating & jig boring .....	13,449
grinders .....	8,062
drilling machines .....	335,000
die sinkers .....	12,230
machine tools .....	11,662
gages .....	24,281
Norma-Hoffman Bearings Corp., Stamford, Conn.; ball bearings .....	14,857
Norton Co., Worcester; grinding points .....	1,614
grinding wheels .....	1,162
grinders .....	1,631
Ohio Steel Foundry Co., Lima, Ohio; castings .....	825,000
Pangborn Corp., Philadelphia; parts for shotblast machines .....	1,018
Parent Metal Products Co., Philadelphia; tables, benches & cabinets .....	1,220
shelving units .....	2,285
Martin Parry Corp., York, Pa.; wishbone assemblies .....	1,396

# POWER MOVEMENT applied CONVENIENTLY and SIMPLY

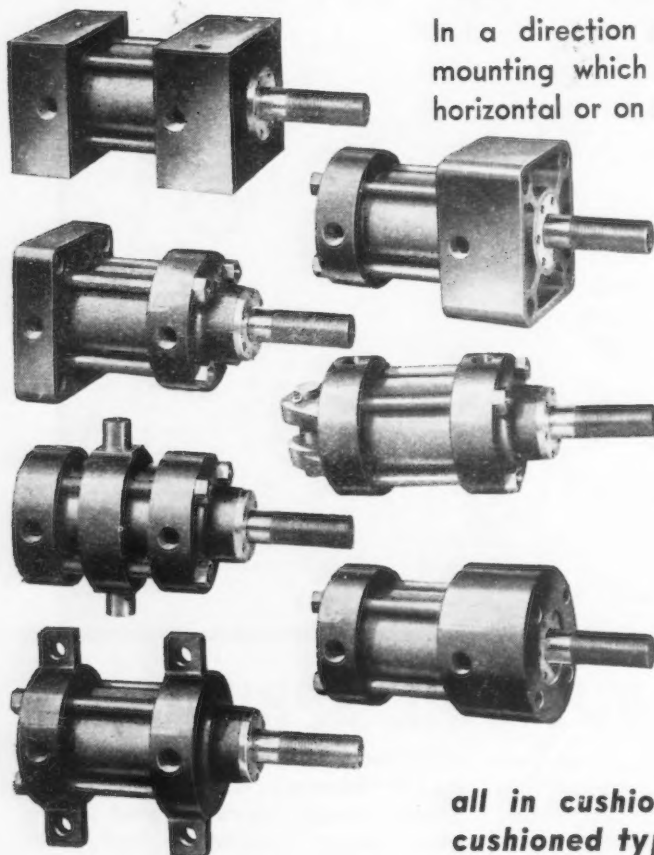
In a direction parallel with the mounting which may be vertical, horizontal or on any angle.

Perpendicularly from the mounting either from the piston rod end or the blank end.

From an end swivel point or from intermediary swivel points.

Perpendicularly from a piloted mounting or from between supports.

**all in cushioned or in non-cushioned types.**



It will aid in more prompt deliveries, if these standard designs are used. These can be furnished with the least amount of personal attention, requiring no delaying special material requisitions or manufacturing provisions that are necessary for special designs.

Hydraulic Cylinders are shown. These are described in our Catalog H-40. Similar designs are available for compressed air use.

## THE TOMKINS-JOHNSON CO.

628 North Mechanic Street

Jackson, Michigan

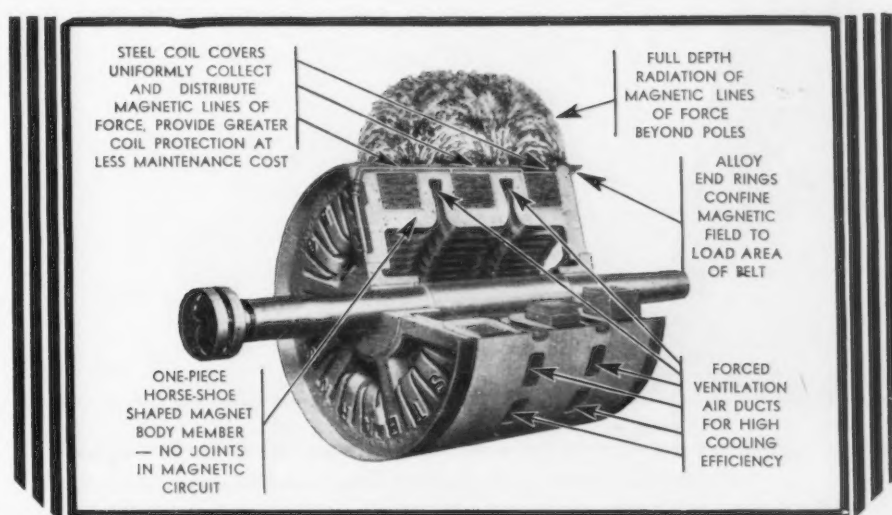


# GOVERNMENT AWARDS

Philadelphia Bronze & Brass Corp., Philadelphia; castings, manganese aluminum bronze .....	74,887
bar, manganese bronze .....	5,423
Pickands Mather & Co., Chicago; pig iron .....	1,920
Poor & Co., Canton Forge & Axle Works, Division, Canton, Ohio; dies and forgings .....	8,532
J. E. Poorman, doing business as R. & L. Tools, Philadelphia; machinery .....	8,418
Precision Mfg. Co., Philadelphia; gages .....	1,557
Pressed Steel Car Co., Inc., Pittsburgh; cars for furnaces .....	12,345
Pullman-Standard Car Mfg. Co., Hammond, Ind.; gun carriages ..	950,300
Quality Tool & Die Co., Indianapolis; gages .....	2,600
Reid Bros. Co., Inc., Beverly, Mass.; tools .....	94,594
Republic Steel Corp., Cleveland; steel bar .....	6,309
Revere Copper & Brass, Inc., Rome, N. Y.; brass bar and phosphor bronze .....	2,183
Rockwood Sprinkler Co., Boston; dry valve .....	1,357
Geo. T. Schmidt, Inc., Chicago; stamping dies .....	1,060
Scully-Jones & Co., Chicago; cutting tools .....	6,418
Shuler Axle Co. Inc., Louisville, Ky.; steel forgings .....	16,584
Somerville Machine & Foundry Co., Somerville, Mass.; castings .....	3,922
Springfield Stamp & Die Co., Springfield, Mass.; steel stamps ..	7,345
Stamford Rolling Mills Co., Springfield, Conn.; discs .....	1,028,595
B. F. Sturtevant Co., Camden, N. J.; ventilators .....	1,772
Sunnen Products Co., St. Louis; honing machines .....	16,224
Superior Die Casting Co., Cleveland; filling plugs .....	1,861
Henry Thompson & Son Co., New Haven, Conn.; saw blades .....	13,868
Thompson Grinder Co., Springfield, Ohio; grinding machines .....	18,560
Threadwell Tap & Die Co., Greenfield, Mass.; rifling head cutters ..	24,000
Timken-Detroit Axle Co., Detroit; assemblies, shoe, upper brake ..	1,800
adapters .....	173,339
Timken Roller Bearing Co., Steel & Tube Division, Canton, Ohio; steel tubes .....	3,175
Union Forging Co., Endicott, N. Y.; drop forgings .....	4,304
United Shoe Machinery Corp., Beverly, Mass.; forgings .....	5,508
guns .....	1,725,000
Universal Power Corp., Cleveland; gas welding rods & arc welding electrodes .....	4,566
Vanadium-Alloys Steel Co., Philadelphia; steel .....	1,527
Van Dorn Iron Works Co., Cleveland; shields .....	420,525
Van Norman Machine Tool Co., Springfield, Mass.; milling machines .....	339,815
Vascoloy-Ramet Corp., North Chicago; reamers .....	4,350
Veit & Young, Philadelphia; dies ..	23,580
Walker Tool & Die Co., Detroit; reamers .....	3,598
Wang Textile Co., Schenectady; charges for fuzes .....	19,305
Ward LaFrance Truck Corp., Elmira, N. Y.; parts for trucks ..	1,227
Weatherhead Co., Cleveland; parts for tanks .....	2,172
Wellman Engineering Co., Cleveland; barrette carriages .....	3,485,420
Western Austin Co., Aurora, Ill.; gun carriages .....	1,609,019
White Motor Co., Cleveland; parts for scout cars .....	108,739
Wisconsin Steel Co., Chicago; steel bar .....	5,041
Wollaston Brass & Aluminum Foundry, N. Quincy, Mass.; castings .....	22,374

Worrell Machine Co., Westfield, Mass.; machines, nut blanking ..	22,644
Worthington Pump & Machinery Corp., Boston; air compressors ..	75,443
gun mounts .....	6,147,400
Yoder Co., Cleveland; guns .....	7,000,000
I. A. Young Spring & Wire Corp., Detroit; steel springs .....	2,399
<b>War Dept., Air Corps:</b>	
Air Cruisers, Inc., Clifton, N. J.; oxygen cylinders .....	\$1,047,592
American Chain & Cable Co., Inc., Detroit; drag assemblies .....	51,300
Atlas Car & Mfg. Co., Cleveland; trucks .....	16,380
Automatic Transportation Co., Chicago; trucks .....	66,960

Baker-Raulang Co., Cleveland; trucks .....	155,400
Bendix Aviation Corp., Eclipse Aviation Division, Bendix, N. J.; supercharger regulator assemblies ..	2,208,405
maintenance parts .....	41,700
Bendix Aviation Corp., Pioneer Instrument Division, Bendix, N. J.; aircraft instruments .....	12,440,553
Boeing Aircraft Co., Seattle; parts for aircraft .....	189,217
Chandler-Evans Corp., South Meriden, Conn.; fuel pumps .....	1,320,877
Crawford Mfg. Co. Inc., Richmond, Va.; container assemblies .....	139,000
Crescent Truck Co., Lebanon, Pa.; trucks .....	53,340



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Just a few of the many original and distinctive features that make the STEARNS Magnetic Pulley the outstanding most for the dollar value today.

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automatic separation, concentration, purification or reclamation there is a size to fit your needs, readily installed in your conveying system. These pulleys are available also in self contained, mobile units.

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SEPARATORS—CLUTCHES—BRAKES—DRUMS—MAGNETS

# S. A. E.

## ALLOY STEELS

# HY-TEN

### OF AIRCRAFT QUALITY

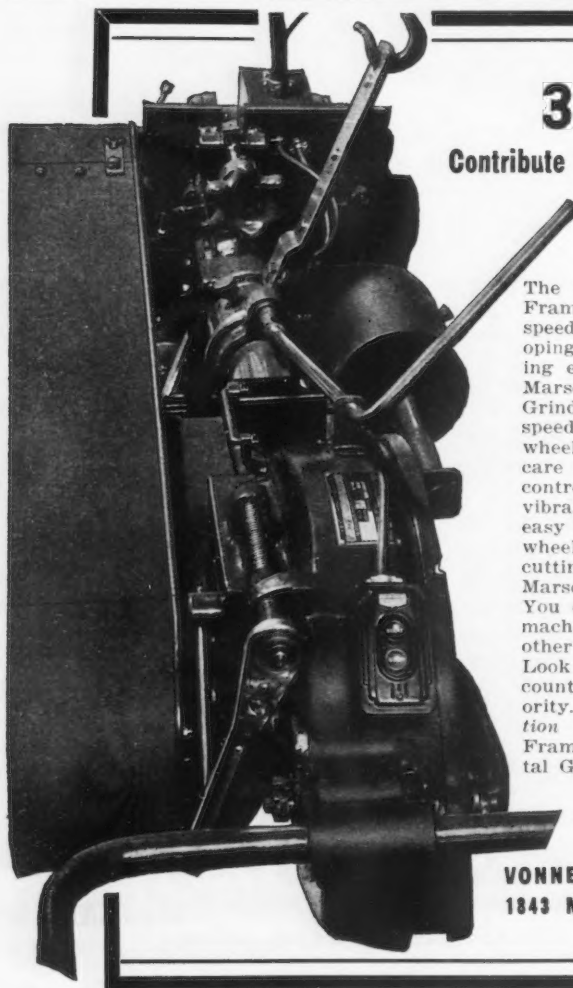
Call on us for aircraft quality electric furnace steels S.A.E. 2330, 4140 and x-4340. Subject to Magnaflux test, they conform to Army and Navy specifications. Hot rolled and cold drawn stock and forgings of all types can be shipped promptly.

Write for Data Sheets giving properties of all our steels. Be prepared when you need steel in a hurry.

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NEWARK  
DETROIT  
CHICAGO  
CLEVELAND  
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CINCINNATI

## Wheelock, Lovejoy & Co., Inc.

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Grinder Efficiency

The Marschke A. C. Swing Frame Grinder shown here has speed control—3 speeds—developing correct s.f.p.m. during each third of wheel life • Marschke D. C. Swing Frame Grinders give constant cutting speed. Adjusting wheel guard to wheel wear automatically takes care of wheel speeds • Speed control, added to Marschke's vibrationless wheel rotation and easy handling, results in steady wheel contact and maximum cutting. Operators can rely on Marschkes for more production. You can expect less wheel and machine expense than with any other swing frame grinder. • Look into the 18 features accounting for Marschke superiority. Write for full information about Marschke Swing Frame, Floor Stand and Pedestal Grinders.

THE MARSCHKE LINE

VONNEGUT MOULDER CORPORATION  
1843 Madison, Indianapolis, Indiana

GOVERNMENT

AWAR



**FORGING FOR DEFENSE:** Like all forging companies throughout the U. S., the forging division of Kropp Forge Co., is kept busy supplying forgings for defense work. An operation in the upset department of the company is shown here.

Curtiss-Wright Corp., Airplane Division, Buffalo; airplanes & parts	107,434,037
Douglas Aircraft Co., Inc., Santa Monica, Cal.; airplanes & spare parts	78,264,093
Easton Car & Construction Co., Easton, Pa.; trucks	46,200
Thomas A. Edison, Inc., West Orange, N. J.; thermometer indicators	248,040
Electronic Laboratories, Inc., Indianapolis; parts for lighting inverters	119,989
Elwell-Parker Electric Co., Cleveland; trucks	46,563
Emerson Electric Mfg. Co., St. Louis; machine gun turrets	20,029,362
Fairchild Engine & Airplane Corp., Fairchild Aircraft Division, Hagerstown, Md.; airplanes & parts	4,329,908
General Motors Corp., Allison Division, Indianapolis; aeronautical engines	124,459,170
parts for engines	62,502
General Motors Corp., New York; hardware	881,875
Walter Kidde & Co., New York; fire extinguisher sets	129,423
Klauer Mfg. Co., Dubuque, Iowa; trucks, snow remover	405,390
Lockheed Aircraft Corp., Burbank, Cal.; airplanes & parts	92,277,800
Longines-Wittnauer Watch Co. Inc., New York; watches, time & stop	186,000



Glenn L. Martin Co., Baltimore; turret assemblies .....	19,007,247
Mercury Mfg. Co., Chicago; trucks	6,140
Palnut Co., Irvington, N. J.; locks, nuts .....	133,799
Rolls-Royce Inc., Detroit; tools ..	133,505
Schweizer Aircraft Corp., Elmira, N. Y.; gliders & trailers .....	53,388
Service Tool & Engineering Co., Dayton, Ohio; aircraft fittings ..	219,932
Sperry Gyroscope Co. Inc., Brooklyn; maintenance parts for automatic pilots .....	370,498
U. S. Department of Agriculture, Forestry Service, Washington; steel towers .....	110,000
Wright Aeronautical Corp., Paterson, N. J.; tools for engines ..	418,521
Yale & Towne Mfg. Co., Philadelphia Division, Philadelphia; trucks .....	167,180

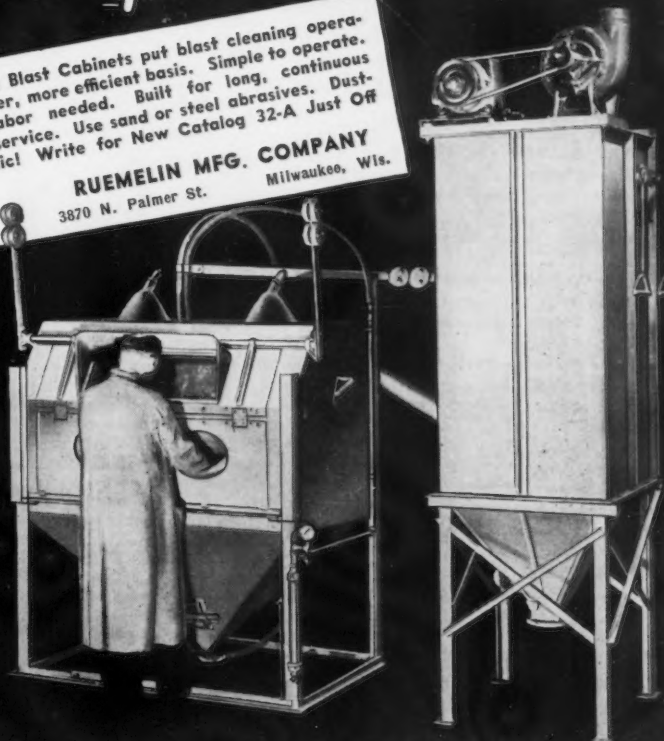
#### War Dept., Signal Corps:

Ampro Corp., Chicago; reels & cans, motion picture .....	\$2,040
Anaconda Wire & Cable Co., New York; wire .....	82,590
Belber Trunk & Bag Co., Woodbury, N. J.; chests .....	3,988
Bell & Howell Co., Chicago; humidors cans & reels, film .....	10,000
Bicknell Mfg. Co., Rockland, Me.; soldering iron .....	2,373
Boon Electric & Amplifier Co., Chicago; tool sets .....	1,940
W. H. Buckingham Mfg. Co., Binghamton, N. Y.; climbers .....	7,859
Camillus Cutlery Co., New York; knives .....	1,793
Caterpillar Tractor Co., Peoria, Ill.; power units .....	11,209
Chicago Tool & Kit Mfg. Co., Chicago; tool sets .....	1,005
Circle Wire & Cable Co., Maspeth, N. Y.; wire .....	1,122
H. M. Cornelius Co., New York; pins .....	3,611
Crosby Co., Buffalo; reels .....	113,698
DeVry Corp., Chicago; trucks, used Diamond Wire & Cable Co., Chicago Heights, Ill.; wire .....	8,370
Douglas Aircraft Co. Inc., Santa Monica, Cal.; cable, plugs, etc. ...	1,281
Douthett Corp., Detroit; trays ..	888
Fairmount Tool & Forging Co., Cleveland; wrenches .....	592
Chas. Fischer Spring Co., Brooklyn; casings, nuts, shafts, etc. ...	1,149
General Cable Corp., New York; wire and reels .....	44,009
General Electric Co., New York; ball bearings, switches .....	63,524
G. Gennert, New York; dryers ..	1,658
Graybar Electric Co. Inc., New York; braces & pins .....	630
Gussack Machined Products, Inc., Long Island City, N. Y.; mast bases, ratchets, washers, etc. ...	5,391
Harvard Lock Co. of New York, Inc., New York; mountings ..	22,215
Independent Lock Co., Fitchburg, Mass.; padlocks .....	56,844
Insuline Corp. of America, Long Island City, N. Y.; alignment tools .....	58,989
Joslyn Co., New York; brackets & crossarms .....	591
screws .....	894
rings .....	767
Karp Metal Products Co. Inc., Brooklyn; cabinet racks .....	33,005
boxes .....	654
Keystone Bolt & Nut Corp., New York; bolts & washers .....	837
Lehigh Equipment Co., New York; cans, cups, pans, etc. ....	4,472
Leich Sales Corp., Chicago; clamps	2,584
W. N. Mathews Corp., New York; anchors .....	886
National Cine Laboratories, New York; tripods .....	622
Par-Metal Products Corp., Long Island City, N. Y.; cabinet racks	4,240
Peter A. Petroff, New York; axles	971
	14,999
	2,577
	9,396

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Ruemelin Sand Blast Cabinets put blast cleaning operations on a faster, more efficient basis. Simple to operate. No skilled labor needed. Built for long, continuous trouble-free service. Use sand or steel abrasives. Dustless! Hygienic! Write for New Catalog 32-A Just Off the Press.

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# GOVERNMENT AWARDS

RCA Mfg. Co., Camden, N. J.; latches, lock screw & nut assemblies .....	720
Remler Co., Ltd., San Francisco; plugs .....	9,920
John A. Roebling Sons Co., New York; wire .....	2,020
Simmon Brothers, Inc., Long Island City, N. Y.; printers .....	602
Simplex Wire & Cable Co., Cambridge, Mass.; wire .....	8,058
Stainless Metal Inc., Long Island City, N. Y.; trays .....	1,066
A. J. Ulmer, New York; terminal blocks .....	1,920
Union Broach Co. Inc., New York; metal handles .....	727
United States Motors Corp., Oshkosh, Wis.; power units .....	6,261
Utica Drop Forge & Tool Co., Utica, N. Y.; pliers .....	4,307
Utilities Service Co., Allentown, Pa.; washers .....	1,435
Edward W. Weiler, New York; soldering equipment .....	1,033
Westinghouse Electric Supply Co., Chicago; axes .....	680
Widin Metal Goods Co., Garwood, N. J.; mast bases, mast section, insulators, etc. ....	40,156
W. S. Wilson Corp., New York; bolts .....	1,862

## War Dept., Corps of Engineers:

American Steel & Wire Co. of N. J., Newark; fencing, Langley Field, Va. ....	\$18,672
Bruns-Kimball & Co., New York; engines & parts .....	2,421
Contractors' Material Co., Jackson, Miss.; round reinforcing steel ..	3,394



"HE SAYS he's a citizen, but he doesn't have a birth certificate."—Skywriter.

Converse Bridge Steel Co., Chattanooga, Tenn.; head blocks, sheaves, hook block housings & one space sheaves .....	5,000
C. H. Dutton Co., Kalamazoo, Mich.; steam pumps, boilers & fittings .....	14,152
Ehret Magnesia Mfg. Co., Valley Forge, Pa.; iron & steel pipes..	29,219
General Motors Corp., Chevrolet Division, Detroit; trucks .....	2,297
M. J. Gibbons Supply Co., Dayton, Ohio; pipes .....	6,535
Harnischfeger Corp., Milwaukee; pile driving attachment for shovel .....	2,275
R. L. Harrison Co., Inc., Albuquerque, N. M.; diesel engine units .....	4,993
Inland Steel Co., Chicago; reinforcing steel .....	32,868

Kalamazoo Railway Supply Co., Kalamazoo, Mich.; hand cars and push cars .....	22,100
R. G. LeTourneau, Inc., Peoria, Ill.; carryall scrapers & rooters wagon scrapers & parts .....	21,720
McGowin-Lyons Hardware & Supply Co., Mobile, Ala.; splicing kits, pulley eyes and cables ....	7,204
Noland Co., Inc., Newport News, Va.; air heating systems .....	8,542
Oliver Iron & Steel Corp., Pittsburgh; track bolts .....	30,618
Osgood Co., Marion, Ohio; shovels & parts .....	88,184
Penn Yan Boats, Inc., Penn Yan, N. Y.; utility power boats ....	103,440
Pittsburgh-Des Moines Steel Co., Pittsburgh; steel standpipes, Presque Isle, Maine, Airport ...	36,500
Powell Pressed Steel Co., Hubbard, Ohio; skid & box platforms ...	4,025
J. T. Smith, Dayton, Ohio; road grader .....	5,904
Wimberly & Thomas Hardware Co. Inc., Birmingham, Ala.; builders' hardware .....	3,930

## War Dept., Quartermaster Corps:

Cincinnati Galvanizing Co., Cincinnati; parts for stoves, tent ....	\$4,500
Enterprise Tool & Metal Works, Chicago; parts for field ranges..	906
General Motors Corp., Chevrolet Division, Melrose, Cal.; truck, 1/2 ton .....	384
Liberty Foundry Co., St. Louis; parts for stoves, tent .....	650
Lockwood Mfg. Co., Cincinnati; parts for stoves, tent .....	13,800
National Marking Machine Co., Cincinnati; machines, marking, laundry .....	1,620
Pantex Pressing Machine, Inc., Central Falls, R. I.; laundry presses .....	3,719
St. Joe Machines, Inc., St. Joseph, Mo.; presses, laundry .....	3,072
Southern Co-Operative Foundry Co., Rome, Ga.; parts for stoves, tent .....	1,125
United States Hoffman Machine Corp., New York; washing machines, drying tumblers & extractors .....	11,960

## War Dept., Medical:

H. Boker & Co., Inc., New York; forceps .....	\$7,780
Hackensack Specialty Mfg. Co., Hackensack, N. J.; forceps .....	16,946
Fred Haslem & Co. Inc., New York; forceps & towels .....	6,075
Penn Surgical Co., Philadelphia; surgical instruments .....	4,615
Schnefel Bros. Corp., Newark; forceps .....	16,800
J. Sklar Mfg. Co., New York; surgical instruments & shears ....	24,313
Edward Week & Co., New York; forceps .....	59,154
Zimmer Splint Co., New York; shears, plaster paris .....	16,800
aluminum litters .....	9,905
	59,235

## War Dept., Chemical Warfare Service:

Eureka Vacuum Cleaner Co., Detroit; brass ferrules .....	\$5,557
Federal Tin Co., Baltimore; sheets of tinplate .....	10,608
Milwaukee Stamping Co., Milwaukee, Wis.; canister assemblies, chemical container assemblies & seat assemblies .....	178,187
National Stamping Co., Detroit; clamps, outlet valve assemblies.	21,200
Waterbury Buckle Co., Waterbury, Conn.; web strap buckles .....	17,232

## War Dept., Defense Plant Building:

American Crucible Products Co., Lorain, Ohio; machinery & equipment for manufacture of aircraft precision-machined parts	\$20,348
--	----------

# You Can Depend On "Hercules" (Red Strand) Wire Rope

## Highlights of Quality

1. Acid Open-Hearth Steel Wire
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4. Furnished in both the Round and Flattened Strand constructions, in either Standard or Preformed Type.

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There is no guess work when you use "HERCULES" (Red-Strand) Wire Rope. It is designed and built to do specific jobs better . . . safer . . . more economically. If you will tell us how you use wire rope, we shall be glad to suggest the construction and type most suitable for your conditions.

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# PERSONALS . . .

• **H. D. Tanner**, vice-president and manager of the machinery division of the Pratt & Whitney division of Niles-Bement-Pond Co., Hartford, was made vice-president and assistant general manager. Mr. Tanner received his mechanical engineering education at Brown University and the Rhode Island School of Design. Before joining Pratt & Whitney in 1920, Mr. Tanner was with Brown & Sharpe in Providence for eight years.

**A. H. d'Arcambal**, sales manager of the small tool and gage divisions and consulting metallurgist, and **William P. Kirk**, sales manager of the machinery department, were elected vice-presidents. For five years, Mr. d'Arcambal was connected with various automotive concerns in Detroit and before joining Pratt & Whitney in 1919, he was with Wright-Martin Aircraft for two years as chief metallurgist. Mr. Kirk has been with Pratt & Whitney since his graduation from Columbia University in 1907.

• **Capt. A. B. Court**, on leave of absence from the United States Naval Academy at Annapolis and the Massachusetts Institute of Technology has been appointed

vice-president in charge of shipyards of Los Angeles Shipbuilding & Drydock Corp., San Pedro, Cal.

Also added to the staff are **William B. Furgeson**, production manager, who has had a long career in Philadelphia as a shipbuilder, **Samuel C. Weston**, assistant production manager, and **W. T. Faulkner**, hull superintendent.

• **August Giese**, formerly superintendent of the slab and blooming mills, has been appointed division superintendent of maintenance, Gary Works, Carnegie-Illinois Steel Corp., Pittsburgh. Mr. Giese was general mill foreman of the 76 in. hot strip mill, Inland Steel Co., Chicago, before going to Gary. He had been superintendent of mechanical and electrical maintenance of the coke plant, chief design engineer and superintendent of 36 in. slab and 44 in. blooming mills at Gary before receiving his present promotion.

• **F. R. Kaimer**, superintendent of the York, Pa., Works of the General Electric Co. since 1940, has been appointed manager there. Mr. Kaimer first went to York in 1930 to take charge of engineering, development and laboratory control after being employed for five

years at G-E's Bridgeport Works laboratory. **F. H. Mains**, who had been superintendent since 1926, has been named manager of the New Kensington, Pa., Works and **W. H. Tangeman**, who has been associated with the Ontario plant since 1914, before it was taken over by General Electric, is the new manager of the Ontario, Cal., works.

• **Norman J. Vile**, who recently resigned as works manager of the Corbin Cabinet Lock division of the American Hardware Corp., New Britain, Conn., has been added to the staff of the Union Mfg. Co., also of New Britain, to work on special problems.

• **Robert M. Kalb**, who was research engineer of the Bell Telephone Laboratory, New York, for 13 years, has been appointed assistant chief engineer of the Kellogg Switchboard & Supply Co. of Chicago. Mr. Kalb is the holder of several patents for improvements on various telephone apparatus and has written a number of articles on magnetism.

• **Bruce Scrimgeour**, former general manager of the Consolidated Shipbuilding Co. of New York, has been appointed general manager of the Niagara Shipbuilding Co., Buffalo.

• **Frank J. Bailey**, commanding officer in Buffalo for both the State



• • • **H. D. TANNER** (left), vice-president and assistant general manager of the Pratt & Whitney division, Niles-Bement-Pond Co., Hartford.  
• • • **A. H. D'ARCAMBAL** (center), and **WILLIAM P. KIRK** (right), new vice-presidents at Pratt & Whitney.

Naval Militia and the U. S. Naval Reserve, has been appointed director of the engineering division of the Defense Contract Distribution Service of the OPM to replace **George E. Slocum**, who has been transferred to Washington with Navy's Division of Contract Distribution.

- **Ben H. Jones**, formerly assistant sales manager, has been appointed assistant vice-president of the National Screw & Mfg. Co., Cleveland. At the same time, **L. H. Norton** was named assistant controller, and **S. M. Washabaugh** promoted from sales department to manager of the order and production department.

- **Edward D. Monk**, since 1926 assistant manager of transformer sales of the General Electric Co., Pittsfield, Mass., has been named manager. Mr. Monk entered the employ of the company in 1909 shortly after being graduated from the University of Toronto.

- **W. H. Milton, Jr.**, has been made manager of the General Electric Co., Pittsfield, Mass., plastic department. He succeeds **G. H. Shill**, who has been made assistant to the manager of the company's Bridgeport, Conn., appliance department. Mr. Milton became associated with the plastic department in 1939 as sales manager, and last year was made assistant manager.

- **W. J. Thomas**, who has spent nine years with the process equipment division of the Babcock & Wilcox Co. at Barberton, Ohio, has now been transferred to the executive department of the sales offices of the Babcock & Wilcox Tube Co., Beaver Falls, Pa. Prior to going with the Babcock & Wilcox company, Mr. Thomas was associated with the Petroleum Iron Works Co. at Sharon, Pa., as assistant manager of sales.

- **J. E. Strachan, Jr.**, Cincinnati representative of the Norton Co., Worcester, Mass., has been assigned to the Pacific Northwest, replacing **A. M. Pitts** who has resigned. **S. F. Prescott** of the Worcester sales engineering department has been named salesman for the Cincinnati territory. **J. P. Enright** and **Wendell C. Forsman** become field engineers for the Chicago and Detroit districts respectively.



**WALLACE F. ARDUSSI** who is in charge of research and product development at Boote Brothers Gear & Machine Corp.

- **C. Wilson, Jr.**, formerly of the New York office of the Yarnall-Waring Co., Philadelphia, has been appointed district manager of the Pittsburgh-Cleveland territory and **C. N. Maxfield** will be manager of the territory covering Michigan and western Ohio. **Bernard R. Bristol** and **Charles H. Grosjean** have been named to the New York sales staff; **A. E. Robinson** has been added to the sales force at Chicago and **A. L. Aicher**, for years a member of the factory engineering staff, goes to the Philadelphia sales office.

- **Harry Enslinger** has been placed in charge of the New York office, 233 Broadway, of the Cardox Corp., Chicago.

- **Harold Sines Vance**, chairman of the board of directors of the Studebaker Corp., South Bend, Ind., has been elected to the board of trustees of the Illinois Institute of Technology.

- **George C. A. Opp** has been elected chairman of the Detroit Industrial Safety Council board of directors. He has previously been a director of the National Safety Council. Other officers of the Safety Council in Detroit are **Clarence E. Weiss**, personnel director, Packard Motor Car Co. who was elected vice-chairman; **R. P. Fohey**, treasurer of the Chrysler Corp., treasurer; and **Frank A.**

**Morrison**, president of Corporate Service, Inc., assistant treasurer; **Clarence E. Wormuth** is council manager.

- **Wallace F. Ardussi** has been placed in charge of research and product development for Foote Brothers Gear & Machine Corp., Mr. Ardussi has been associated with the automotive industry since his graduation in 1928 from the Engineering College of the University of Michigan. Before going to the Foote Brothers organization, he was for 10 years connected with the Chrysler Corp. in research and sales capacities.

- **Dr. Frank Hugh Sparks**, once a manufacturer of automobile accessories, has been inaugurated as president of Wabash College, Crawfordsville, Ind. Dr. Sparks gave up business activities in 1935 to become an educator. For six years past he has been studying and also acting as a lecturer on economics at the University of California. Dr. Sparks' last connection with business was as co-founder of the Noblitt-Sparks Industries, makers of automobile heaters, radio sets and other accessories.

- **Frank W. Rowe**, general purchasing agent of Johns-Manville Corp., New York, for 23 years, is among the first to retire under the company's new retirement plan. Mr. Rowe joined Johns-Manville in 1914 after serving as a purchasing agent for the General Electric Co. In 1937 he relinquished his post as general purchasing agent and became purchasing consultant for the company.

- **Charles Andrews** has retired as manager of the Washburn Co. plant in Rockford, Ill. Mr. Andrews, who has been in the wire goods manufacturing business for 56 years, retains his post as director of the company. He is succeeded as plant manager by **Harry Green**, assistant plant manager for the past 12 years.

- **G. V. Woody**, priorities administrator for the Allis-Chalmers Mfg. Co., Milwaukee, addressed the members of the Milwaukee Junior Association of Commerce at its recent meeting which was designated as Allis-Chalmers Day. **Max Babb**, president of Allis-Chalmers, and **Walter Geist**, vice-president, were guests for the occasion.



## OBITUARY . . .

• **Ernest Benjamin Drake**, on the staff at Wayne University, Detroit, for 20 years and head of chemical engineering at the institution, died Oct. 23 aged 54 years. Professor Drake was a graduate of the University of Michigan and held a master's degree. He was a past president of the American Institute of Mining and Metallurgical Engineers.

• **Lewis J. Frost**, for 28 years secretary-treasurer of the Boosey Mfg. Co., Detroit, died Oct. 21.

• **Robert J. Brennan**, a pioneer in the automobile industry, died Oct. 22 at Bloomfield Hills, Mich. In the early days of the industry he was an officer in the Warren Motor Car Co. Later he was connected with the Advance Machine Co., was president of the American Paint & Glass Co. and a partner in a brokerage firm of Debois & Brennan. Mr. Brennan was educated at the University of Michigan and in his early years was employed by the government as a civil engineer surveying shipping channels in the Great Lakes. He was 72 years old and had been retired from business since 1915.

• **Henry J. Bigger**, general manager for the American Can Co., Canadian district, died suddenly at his home in Hamilton, Ontario. He was 59 years old. Starting work with the American Can Co. when he had finished school at the age of 19, Mr. Bigger had served as local sales manager at Portland, Ore., general manager of the company at Vancouver, and later as general manager of the Canadian district.

• **Stephen M. Perrigo** died in Chicago on Oct. 27. Mr. Perrigo started work for E. C. Atkins & Co. in 1902 as demonstrator of hand saws, covering practically the entire United States. A few years later he became manager of the Chicago branch, serving in this capacity until May, 1936, when impaired health forced him to retire from the managership. He was 77 years old.

• **John L. Clemmey**, owner of the Steel Fabricating Co., Mansfield, Mass., died at his home in Fall River, Mass., Nov. 6. He was 49 years old.

• **Frank L. Koralewsky**, one of the country's most distinguished artisans in wrought iron, died Nov. 4. He was a native of Poland where he learned his craft. His shop won several high medals at national and international exhibitions. His work can be found at the State House, Boston, Harvard University, Boston College, Princeton, as well as in churches of many denominations.

• **Henry Newton** who retired from Brown & Sharpe Mfg. Co. at the close of 1937, after 48 years of service, died suddenly on Oct. 30 at Providence, R. I., aged 77 years. In addition to having served in the advertising and small tool departments for a number of years, he had charge of foundry sales and was particularly identified in representing the company in connection with their manufacture of Willcox & Gibbs Sewing Machines.

• **J. Edward Inman**, Wisconsin representative for the Gaylord Container Co., was fatally injured in an automobile accident near Curtis, Wis.

• **William G. Pipenhagen**, president of the Vacu-Matic Carburetor Co. and the Master Glaze Co., both of Milwaukee, died suddenly Nov. 2. He was 43 years old. Mr. Pipenhagen was a newspaper man in Milwaukee and in 1923 became advertising manager of the A. J. Lindemann & Hoverson Co. He organized the carburetor concern in 1933.

• **Thomas J. Costello**, in charge of the open hearth department at the Toronto, Ohio, plant of Follansbee Steel Corp. for the past 20 years, died Nov. 3, aged 67 years.

• **John C. Hayes, Jr.**, died at his home in Chicago, Nov. 6, after a brief illness. For 25 years he was associated with Freyn Engineering Co., Chicago, as combustion engineer. Previously he had served many years at South Works of the Carnegie-Illinois Steel Corp. He was 56 years old.

• **Walter Greenwood**, one of the pioneer safety workers in the steel industry, died at his home in Youngstown, Ohio, Sept. 29, aged 94 years. Born in Girard, Pennsylvania, Mr. Greenwood led a varied career following Civil War services in the United States Navy,

working in the oil industry, on the railroads, as farmer, shoemaker, telegraph operator, and in private business. He was safety engineer for the Carnegie Steel Company for 21 years, retiring in 1928, at the age of 81. He was the oldest man on the pension rolls of the corporation.

• **John Bolton**, for 15 years European director of the Ingersoll-Rand Co., New York, was killed Oct. 25 when his car struck a parked truck. Mr. Bolton was born in England 52 years ago and had managed the offices of the Ingersoll-Rand Co. in Vienna and Budapest.

• **August P. Munning**, former general sales manager of Cutler-Hammer, Inc., Milwaukee, died Oct. 29 at Matawan, N. J., where he was president of the Matawan bank, aged 68 years. He was with Cutler-Hammer for 16 years and was a member of the Edison Pioneers, an organization of Thomas A. Edison's early associates.

• **Christian Lauritzen**, president and treasurer of the Wisconsin Gear & Engineering Co., Inc., Milwaukee, died Oct. 26 in a local hospital after a short illness. He came to this country in 1891 from Denmark and in 1920 went to Milwaukee and founded the firm of which he was president. He was 76 years old.

• **Dean R. Williams**, Milwaukee representative of the Erie Forge Co., died in a Milwaukee hospital as the result of injuries sustained in a fall. He was assistant purchasing agent for the Allis-Chalmers Mfg. Co. until 1906 when he became purchasing agent of the A. O. Smith Co.

• **Joseph B. Sessions**, president of the Sessions Foundry Co., Bristol, Conn., died at a hospital in that city Nov. 1 after a short illness. He was 50 years old, and succeeded his father, the late William E. Sessions, as president of the foundry. He was also treasurer of the Sessions Clock Co. and president of the Bristol Trust Co.

• **William G. Kirkman**, general superintendent of Harrison Steel Castings Co., Attica, Ind., died Oct. 31.

# CONSTRUCTION STEEL

... STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

## Fabricated Steel

Lettings jump to 44,450 tons from 6900 tons last week; new projects slightly lower at 17,425 tons; plate awards call for 5465 tons.

### AWARDS

#### NORTH ATLANTIC STATES

- 2700 Tons, Pottstown, Pa., Jacobs Aircraft Co. plant, to Bethlehem Steel Co., Bethlehem, Pa.  
1911 Tons, Brooklyn test laboratory for navy yard, to Lehigh Structural Steel Co., Allentown, Pa.  
610 Tons, Waterbury, Conn., manufacturing building for Vickers, Inc., to American Bridge, Pittsburgh.  
300 Tons, Watertown, Mass., extension to arsenal building No. 41, to Frank M. Weaver Co., Lansdale, Pa.  
200 Tons, Melville, R. I., storehouse for Navy fuel department, to John E. Cox Co., Fall River, Mass.  
125 Tons, Farmingdale, Long Island, hangar for Fairchild Engineering & Aircraft Corp., to American Bridge Co., Pittsburgh.  
100 Tons, Watervliet, N. Y., extension to three arsenal buildings, to Frank M. Weaver Co., Lansdale, Pa.

#### THE SOUTH

- 7300 Tons, Bauxite, Ark., defense plant for Aluminum Co. of America, to American Bridge Co., Pittsburgh.  
342 Tons, Paris, Tenn., balloon hangar, to Bethlehem Steel Co., Bethlehem, Pa.  
105 Tons, Campbell County, Ky., State highway bridge, to Midland Structural Steel Co., Cicero, Ill.

#### CENTRAL STATES

- 400 Tons, Ironwood, Mich., Penokee Ore Co. pine shafts, to Worden Allen Co., Milwaukee.  
127 Tons, Cincinnati, building No. 41 for Meyer-Hecht Co., to an unnamed bidder.

#### WESTERN STATES

- 8500 Tons, Moffett Field, Cal., wind tunnel, to Pittsburgh-Des Moines Steel Co., Pittsburgh.  
8000 Tons, Troutdale, Ore., defense plant for Aluminum Co. of America, to Bethlehem Steel Co., San Francisco.  
6000 Tons, Los Angeles, defense plant for Aluminum Co. of America, to Bethlehem Steel Co., Los Angeles.  
6000 Tons, Spokane, Wash., defense plant for Aluminum Co. of America, to American Bridge Co., Pittsburgh.  
1500 Tons, Santa Monica, Cal., assembly building for Douglas Aircraft Co., to Bethlehem Steel Co., San Francisco.  
220 Tons, Bremerton, Wash., forge shop at Puget Sound Navy Yard, to Pittsburgh-Des Moines Steel Co., Pittsburgh.

## PENDING STRUCTURAL STEEL PROJECTS

#### NORTH ATLANTIC STATES

- 958 Tons, Mechanicsville, N. Y., highway project, S.H. 41-3; bids Nov. 19.  
900 Tons, Williamsport, Pa., Aviation & Transportation Corp., factory building; bids taken in Detroit.  
475 Tons, Philadelphia, Navy Yard building addition, bids Nov. 13.  
420 Tons, Felts Mills, N. Y., highway project, S.S. 41-4; bids Nov. 19.  
380 Tons, South Boston, Mass., gun protections for U. S. Engineers Office.  
165 Tons, Passaic, N. J., structural shop extension for Robins Conveying Belt Co.  
125 Tons, Baltimore, pipe and electric shop, for Maryland Dry Dock Co.

#### THE SOUTH

- 570 Tons, Tyrone, Ky., unit No. 1, Tyrone power station for Kentucky Utilities Co.  
140 Tons, Roanoke, Va., bridge for American Viscose Corp.; bids in.

#### CENTRAL STATES

- 2650 Tons, Beloit, Wis., engine and welding shops for Navy.

- 2460 Tons, Massillon, Ohio, Pennsylvania bridge over Tuscarawas River for U. S. Engineers Office.  
1705 Tons, Kansas City, Mo., southwest traffic viaduct; bids Nov. 18.  
500 Tons, Logan County, Ill., State bridge; bids Nov. 18.  
290 Tons, Cuyahoga Heights, Ohio, building for Arcrods Corp.

#### WESTERN STATES

- 3500 Tons, Fort Peck, Mont., Fort Peck Dam; bids Nov. 21.  
750 Tons, Renton, Wash., Pacific Car & Foundry Co. foundry.  
678 Tons, Los Angeles, Firestone Boulevard bridge (Invitation 115); bids Dec. 1.  
500 Tons, Los Angeles, United States Rubber Co. plant addition; Engineers, Ltd., Los Angeles, contractor.  
240 Tons, Coram, Cal., fixed wheel gates, Specification 1009 for Bureau of Reclamation.

## FABRICATED PLATES

### AWARDS

- 2300 Tons, Moffett Field, Cal., wind tunnel, to Pittsburgh-Des Moines Steel Co., Pittsburgh.  
1850 Tons, Alaska, Army storage tanks, to James G. Heggie & Sons, Inc., Joliet, Ill.  
1013 Tons, Tynor, Tenn., 48-in. steel pipe, to Chicago Bridge & Iron Co., Chicago.  
300 Tons, Arlington, Mass., 24-in. pipe, to Walsh-Holyoke Steam Boiler Works, Holyoke, Mass.

### PENDING PROJECTS

- 625 Tons, Wilmington, Cal., three 56,000-bbl. tanks for Los Angeles Department of Water and Power; Chicago Bridge & Iron Co., Los Angeles, low bidder.

## Cast Iron Pipe

Providence, R. I., is asking bids on 325 tons of 6-in. class B pipe and 75 tons of class B 8-in. pipe.

Water Department, San Antonio, Tex., plans about 11,000 ft. of 12-in. pipe, 4000 ft. of 16-in., and 6600 ft. of 10-in. for extensions in main pipe line for water supply in different parts of city. Also plans installation of additional pumping machinery to provide daily increase of 6,000,000 gal., and other waterworks improvements. Cost about \$125,000. Financing is being arranged through Federal aid. W. D. Masterson is manager.

Pinehurst Water District, Snohomish County, near Everett, Wash., care of Parker & Hill, Smith Tower Building, Seattle, consulting engineers, plans about 55,000 ft. of 2 to 8-in. pipe for extensions in water system; also 100,000-gal. tank, motor-driven pumping machinery and other equipment. Cost close to \$100,000. Financing is being arranged through Federal aid.

General Purchasing Officer Panama Canal, Washington, asks bids until Nov. 19 for 25-, 15,000 ft. of similar pipe, single hub; fittings, 000 ft. of cast iron soil pipe, double hub; flange unions, extension hangers, valves and other equipment (Schedule 5693).

Office of Defense Public Works, Los Angeles, will take bids Nov. 18 for furnishing San Luis Obispo, Cal., with 8410 ft. of 14-in., 7370 of 12-in., 6500 of 10-in., and 4590 ft. of 8-in. cement lined pipe, class 150; 15,800 ft. of 18-in., class 200; 8400 ft. of 12-in. 350 lb. working pressure cast iron pipe and accessories, with alternate on 1/4-in. wall welded steel pipe on two latter items. Bids also will be asked Nov. 18 for furnishing San Diego with 5600 ft. of 16-in., class 200; 36,000 ft. of 16-in., class 250; 1000 ft. of 16-in. ball joint; 1000 ft. of 16-in., class 250, and 1250 ft., class 200, bolted joint, and 5750 ft. of 18-in., class 200, bell and spigot cast iron pipe and accessories.

## Reinforcing Steel

Awards of 19,800 tons; 6750 tons in new projects.

### AWARDS

#### ATLANTIC STATES

- 3050 Tons, Brooklyn, Navy Yard super dry-dock additional requirements, to Bethlehem Steel Co.; Dry Dock Associates, Bethlehem, Pa., contractors.  
1400 Tons, Queens, N. Y., grade separations, to Bethlehem Steel Co., Bethlehem, Pa.; Garafano Construction Co., contractor.  
950 Tons, Washington, MacMillan reservoir, to Bethlehem Steel Co., Bethlehem, Pa.; Euclid Construction Co., contractor.  
900 Tons, Bayonne, N. J., Navy Yard dry-dock crane foundations, to Bethlehem Steel Co., Bethlehem, Pa.  
820 Tons, Tonawanda, N. Y., Chevrolet aviation engine plant, to Bethlehem Steel Co., Bethlehem, Pa.; Darin & Armstrong, contractors.  
800 Tons, Portsmouth, N. H., Navy Yard facilities, to Bethlehem Steel Co., Bethlehem, Pa.  
600 Tons, Niagara Falls, N. Y., Bell Aircraft Corp. plant addition, to Truscon Steel Co., Buffalo, through Austin Co., Cleveland.  
600 Tons, Melville, R. I., storehouse for Navy fuel department, to Joseph T. Ryerson & Son, Inc., Cambridge, Mass.  
400 Tons, Newport, R. I., power plant for Navy, to Truscon Steel Co., Boston.  
400 Tons, Baltimore, Chesapeake & Potomac Telephone Co., to Bethlehem Steel Co., Bethlehem, Pa.  
300 Tons, Boston, switching station for Boston Edison Co., to Bethlehem Steel Co., Bethlehem, Pa., through Thomas O'Connor Co., Boston, contractor.  
250 Tons, Springfield, Mass., armory service building, to Truscon Steel Co., Boston.  
150 Tons, Washington, Navy Yard storage building, to Bethlehem Steel Co., Bethlehem, Pa.; Diamond Construction Co., contractor.  
140 Tons, Paterson, N. J., test cells for Wright Aeronautical Corp., to Republic Steel Corp., Cleveland, through Mahony-Troast Corp., general contractor.

#### THE SOUTH

- 120 Tons, Portsmouth, Va., Norfolk Navy Yard housing, to Bethlehem Steel Co., Bethlehem, Pa.; Allen J. Saville, contractor.  
116 Tons, Shawnee, Okla., project FAP-122-A (2), to Sheffield Steel Corp., Kansas City, Mo.

#### CENTRAL STATES

- 750 Tons, Granite City, Ill., General Steel Castings Corp., to Laclede Steel Co., St. Louis.  
150 Tons, Philo, Ohio, Ohio Power Co. plant, to Truscon Steel Co., Youngstown.  
130 Tons, Lockland, Ohio, Wright Aeronautical Corp. water softening plant, to Pollak Steel Co., Cincinnati; F. Messer & Son, contractors, Cincinnati.  
125 Tons, Marion, Ill., ordnance plant, to Joseph T. Ryerson & Son, Inc., Chicago.  
100 Tons, Stickney Township, Ill., Community high school, to Joseph T. Ryerson & Son, Inc., Chicago.

#### WESTERN STATES

- 1500 Tons, Remaco, Colo., Remington small arms plant, to Colorado Fuel & Iron Co., Denver; Broderick & Gordon, contractors.  
500 Tons, San Diego, Cal., vehicular overpass at Consolidated Aircraft Corp. plant, to Truscon Steel Co., Los Angeles.  
106 Tons, Kremling, Colo., Invitation C-46225-A, to Colorado Fuel & Iron Co., Denver.

#### BRITISH WEST INDIES

- 780 Tons, Trinidad, Army air base, 450 tons to Youngstown Sheet & Tube Co.



## CONSTRUCTION STEEL

Youngstown: 330 tons to Jones & Laughlin Steel Corp., Pittsburgh.

### CANAL ZONE

- 2346 Tons, Balboa, War Department Invitation 54434, to Republic Steel Corp., Cleveland.  
2313 Tons, Cristobal, War Department Invitation 1409, to Republic Steel Corp., Cleveland.

### PENDING REINFORCING BAR PROJECTS

#### ATLANTIC STATES

- 600 Tons, Rochester, N. Y., factory building for Bond stores.  
250 Tons, Lester, Pa., Westinghouse Electric & Mfg. Co. plant.  
204 Tons, Newburgh, N. Y., highway projects, R.C. 41-50 and S.H. 41-2; bids Nov. 19.  
204 Tons, Mechanicsville, N. Y., highway project, S.H. 41-3; bids Nov. 19.  
104 Tons, Felts Mills, N. Y., highway project, S.S. 41-4; bids Nov. 19.

#### THE SOUTH

- 250 Tons, Stafford County, Va., Rappahannock River bridge.  
200 Tons, Newport News, Va., municipal filtration plant; bids taken.  
100 Tons, Henderson, Ky., anhydrous ammonia plant.

#### CENTRAL STATES

- 400 Tons, Detroit, Briggs Mfg. Co. gun turret plant, W. E. Wood Co.  
227 Tons, Smithsbur, S. D., Deerfield Dam (Invitation 12,043-A); bids taken.  
200 Tons, Cleveland, Kingsbury run sewer; bids taken.  
200 Tons, Lansing, Mich., municipal power plant.  
150 Tons, Minneapolis, city coal dock.

## Weekly Bookings of Construction Steel

Week Ended	Nov. 11, 1941	Nov. 3, 1941	Oct. 14, 1941	Nov. 12, 1940	Year to Date	
	1941	1941	1941	1940	1941	1940
Fabricated structural steel awards	44,450	6,900	23,900	25,300	1,174,470	1,011,411
Fabricated plate awards	5,465	0	0	5,290	126,105	133,000
Sheet steel piling awards	0	0	0	0	26,760	65,180
Reinforcing bar awards	19,800	6,750	13,850	9,875	655,280	412,185
Total letting of Construction Steel	69,715	13,650	37,750	40,465	1,982,615	1,621,776

- 130 Tons, Mounds-Mound City, Ill., U. S. Engineer, flood wall project.

#### WESTERN STATES

- 1900 Tons, Wilmington, Cal., Department of Water and Power steam plant.  
900 Tons, Fort Peck, Mont., Fort Peck Dam; bids Nov. 21.  
368 Tons, Odair, Wash., left power house, Grand Coulee power plant (Invitation D-38,158-A); bids taken.  
191 Tons, Los Angeles, Firestone Boulevard bridge (Invitation 115); bids Dec. 1.  
165 Tons, Friant, Cal., Friant Dam (Invitation 48,902-A); bids in.

miles to north of city, for natural gas transmission for service in neighboring districts.

Hope Natural Gas Co., Union Building, Charleston, W. Va., has plans for new welded steel pipe line from natural gas field near Monroe, La., to Charleston and neighboring districts, about 1000 miles, initially projected several months ago. Cost close to \$25,000,000 with booster stations and other operating facilities. Company is a subsidiary of Standard Oil Co. of New Jersey, 26 Broadway, New York.

Constructing Quartermaster, Fort Bragg, N. C., closes bids Nov. 15 for 20,599 ft. of 1/2-in. galvanized steel pipe, and fittings (Circular 6357-8).

Cities Service Gas Co., Bartlesville, Okla., affiliated with Cities Service Oil Co., same address, has authorized immediate construction of new 16-in. welded steel pipe line from gas field near Cement, Caddo County, Okla., to Oklahoma City, about 55 miles, for natural

## Pipe Lines

Northern Natural Gas Co., Aquila Court Building, Omaha, Neb., B. R. Bay, general manager, plans extensions in welded steel pipe lines near Beatrice, Neb., about 16

# WIRE

## Now and Later

If priorities and shortages are bothering you, note that you can get steel wire, now, from Johnson Steel & Wire Co.

Music wire and many special grades are being shipped from three warehouses—Los Angeles, Akron, and Worcester.

We have served thousands of manufacturers in the past, and we are serving them today. Buyers of wire in 1944 will remember the great drought of 1941-42 when manufacturers had a source of supply, in Johnson Steel & Wire Co., that didn't dry up.

★ ★ ★ Wire makers for three generations.

**JOHNSON STEEL & WIRE COMPANY, INC.**

P. O. BOX 1211 - MAIN OFFICE & PLANT

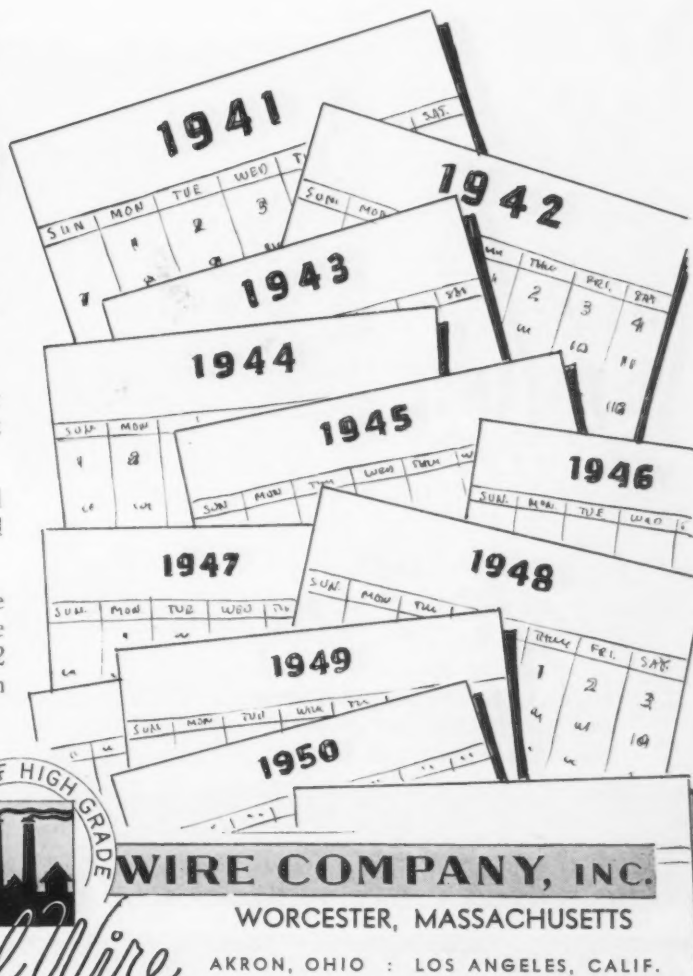
BRANCH PLANTS AND WAREHOUSES



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WORCESTER, MASSACHUSETTS

AKRON, OHIO : LOS ANGELES, CALIF.



# MACHINE TOOLS

... SALES, INQUIRIES AND MARKET NEWS

## High Price Auction Sales Challenge Price Ceilings

Cleveland

• • • The test of the OPA's power to set price ceilings, which was expected to develop on Nov. 4 during a scheduled hearing with respect to the recent bankruptcy sale of the Bender Body Co., has been temporarily postponed while the court awaits further information. This still leaves in the air the question of the legality of the OPA's contention "that all auction sales must be conducted in compliance with price schedule No. 1, and that there is no reason why sales in bankruptcy should be excepted."

Since most prices bid and paid on the equipment in the Bender Body auction exceeded the so-called "price ceiling," the major difficulty will be just how the win-

ners of the various bids will be decided upon if excessive bids are to be voided.

In the meantime, the market for used machinery continues brisk, with the available supply well below that of a year ago. Fulfillment of orders for rebuilt machines are frequently held up some three to four months due to the necessity for waiting for replacement parts.

Eaton Mfg. Co.'s \$2,500,000 order for 37 mm. armor piercing shells is expected to result in some sizable purchasing of lathes and other equipment. Meanwhile, Westinghouse, which earlier received a similar order, is reported to have been seeking to double the orders it recently placed for lathes. The A. W. Hecker Co. has placed a \$100,000 order for milling machines, radial drills, jig boring machines, plane and universal units.

## Builders Oppose Price Limit

Cincinnati

• • • Preparation of various price data demanded by OPA occupied the attention of machine tool manufacturers during the past week, following a postponement of a scheduled meeting on the question of price ceilings. In the interim, of course, further elaboration of factual data, showing the lack of need for price ceilings on new machine tools is going forward.

Business generally, in this area, shows no tendency to abate and the brisk contracting for new tools continues. So far no serious dislocation because of scarcity of materials has been noted, although once in a while shipments may be delayed because of inability to get immediate delivery on extra equipment.

## Small Tool Shortage Seen

Chicago

• • • New defense plants which have been large buyers of machine tools are reporting an increasing shortage of small tools. More and more shipments of new machines are being received that arrive absolutely bare—with only the manufacturer's promise that the tools will be along as soon as they can possibly be obtained. What is disturbing to the bigger consumers is not so much the fact that installation is thus delayed, but that they see a decided hampering of production once it is underway with tool supplies so precarious. One new aviation engine plant in this section figures it will use up between \$25,000 to \$100,000 worth of small tools per day once it gets rolling at top production. For the past three months the tool design heads of this plant have been frantically lining up subcontractors—even educating potential suppliers to add to tool sources.

An example of the drain placed on small tool manufacturers is shown by a figure of about \$367 worth of perishable tools used up on an airplane engine compared to about \$20 for an automotive power plant.

**WEAR-  
RESISTANCE  
AT**



*High Temperature!*

Here is a pair of open hearth charging machine rams. They must stick their face into hot places, and must resist the abrasion that comes from open hearth charging.

They certainly need a hard face to stand up to this type of work, and they've got it! Their face is of the hardest—it's Coast Metal!

This is a typical example of the use of Coast Metals for resisting abrasion and impact at high temperature.

**COAST METALS, Inc.** 1006 McKinley Ave. S. W.  
CANTON, OHIO



# NON-FERROUS METALS

... MARKET ACTIVITIES AND PRICE TRENDS

## OPM Requests 6-Day Week in Lead Industry

••• In an effort to increase domestic lead production, OPM, during the past week, telegraphed all miners and producers urging them to operate "at their maximum productive capacity, 24 hours a day, six days a week and where possible seven." While such a procedure already inaugurated by the St. Joseph Lead Co., will bring about substantial increases in lead supply, the main question asked by producers and miners is, "who will pay the added costs of overtime work?"

The widespread reports of an advance in lead prices brought a statement on Nov. 5 from OPA that present prices are adequate to support a substantial increase in domestic lead output. The recent 1c. a lb. increase in zinc prices was permitted to facilitate increased output of both zinc and lead in the Rocky Mountain Region. Reports of lead price increases have stimulated scrap hoarding and unless this situation is corrected promptly, OPA stated, it may become necessary to impose controls over the flow of scrap at proper prices, which will be below those currently prevailing.

Total slab zinc production, according to reports from the American Zinc Institute, during October reached a new high for the year of 75,980 net tons, up 2755 tons from September production and 356 tons from August production, which was the previous record month. Likewise, domestic and export shipments reported higher this month than any month this year, totaling 73,813 tons. Production of zinc by grades was: special high grade, 16,078 tons; high grade, 17,553 tons; intermediate, 3569 tons; brass special, 7567 tons; select, 1456 tons; and prime western, 29,730 tons.

Manufacturers of copper wire and cable used to conduct electricity were requested by OPA, on Nov. 5, not to exceed their Oct. 15 prices, and were further requested to inform OPA of all changes in prices or terms of sales since Jan. 1, 1940. It was pointed out that the recent conservation order, M-9-C, restricting copper used for civilian purposes, excepts such material in articles used primarily as conductors of electricity and would reduce manufacturers' difficulties in obtaining raw material.

With Far Eastern tin prices at the lowest level since mid-September, equivalent of 51.85c. a lb., New York, importers were able to accept

orders for moderate tonnages during the past week. While the spread between the American and Far Eastern markets is not wide enough to permit most merchants and importers to operate, a moderate tonnage of Straits tin was offered in New York at ceiling prices for November shipment.

Average prices of the major non-ferrous metals during the month of October, based on quotations appearing in THE IRON AGE, were as follows:

	Cents per Lb.
Electro copper, Conn. Valley.....	12.00
Lake copper, east. delivery.....	12.00
Straits tin, spot, New York.....	52.00
Zinc, East St. Louis .....	7.96
Zinc, New York .....	8.36
Lead, St. Louis .....	5.70
Lead, New York .....	5.85



**PERFORATED METALS**

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*Any Metal*

*Any Perforation*

For INDUSTRIAL purposes a great variety of sizes and shapes of perforations are required, ranging from very fine to as large as 6" or more in diameter. We are equipped to supply all standard perforations in all kinds and thicknesses of metals.

**INDUSTRIAL**



**ORNAMENTAL**

ORNAMENTAL patterns are covered by our grille catalog. If interested, we hope you will send for it. There are attractive patterns for different uses.

The **Harrington & King** CO.  
PERFORATING

5657 FILLMORE ST., CHICAGO-114 LIBERTY ST., NEW YORK

## Iron Tonnage in October Reaches New High Mark

••• Another new record was set when actual coke pig iron production for October totaled 4,856,306 net tons compared with 4,716,901 tons in September and 4,791,432 tons in August, the previous high. Output on a daily basis, however, showed a slight loss from that in September, declining from 157,230 tons to 156,655 tons a day. The operating rate for the industry was 98.2 per cent of the new in-

creased capacity of 159,481 net tons of coke pig iron a month, compared with 98.8 per cent in September.

On Nov. 1 there were 214 furnaces in blast producing at the rate of 156,265 tons a day, compared with 216 in blast on Oct. 1 with a production rate of 157,165 tons. The United States Steel Corp. took one furnace off blast,

independent producers put one in blast and took one off, and merchant producers blew out one furnace during October.

Bethlehem Steel Co. blew in the one furnace at Sparrows Point. The furnaces blown out or banked were one Isabella, Carnegie-Illinois Steel Corp.; one Pioneer, Republic Steel Corp., and one Palmerton, New Jersey Zinc Co.

### Production by Districts and Coke Furnaces in Blast (In Net Tons)

	October, 1941		September, 1941			Nov. 1, 1941		Oct. 1, 1941	
		Daily % of Capacity		Daily % of Capacity	October, 1940	No. in Blast	Operating Rate	No. in Blast	Operating Rate
Eastern .....	39,987	114.5	34,327	101.6	33,304	2	1,290	2	1,145
Buffalo .....	306,992	98.8	290,789	96.7	285,520	14	9,905	14	9,695
Philadelphia .....	447,884	95.3	418,750	98.9	393,797	19	14,820	18	14,210
Ferro. and Spiegel....	16,966	96.5	16,908	99.6	9,122	3	390	4	565
Pittsburgh .....	1,148,544	96.1	1,114,689	96.4	1,052,881	48	37,050	48	37,155
Ferro. and Spiegel....	46,631	107.6	39,571	91.4	36,289	4	1,310	5	1,320
South Ohio River.....	103,788	95.4	97,532	92.7	81,674	7	3,350	7	3,250
Valleys .....	578,274	98.8	565,399	99.8	548,725	24	18,655	24	18,890
Wheeling .....	210,303	102.5	205,823	103.6	187,881	9	6,785	9	6,860
Cleveland .....	405,863	99.5	400,827	101.6	379,339	16	13,090	16	12,730
Chicago .....	1,033,759	97.4	1,045,562	101.7	951,203	40	33,380	40	34,850
St. Louis .....	22,817	105.0	8,104	38.5	.....	1	735	1	540
Detroit .....	89,582	77.2	102,535	91.3	112,247	4	2,890	4	3,420
Western .....	67,688	107.7	65,869	108.3	62,088	4	2,185	4	2,195
Southern .....	334,690	106.8	308,737	101.8	311,891	18	10,350	19	10,290
Ferromanganese .....	2,538	27.5	1,479	16.4	.....	1	80	1	50
Total .....	4,856,306	98.2	4,716,901	98.8	4,445,961	214	156,265	216	157,165

### Production of Coke Pig Iron and Ferromanganese

	Pig Iron*		Ferro-Mn†	
	1941	1940	1941	1940
January ..	4,663,695	4,032,022	35,337	43,240
February ..	4,197,872	3,311,480	33,627	38,720
March .....	4,704,135	3,270,499	37,808†	46,260
April .....	4,334,267	3,137,019	44,341	43,384
May .....	4,599,966	3,513,683	47,256	44,973
June .....	4,553,165	3,818,897	42,582	44,631
½ year.....	27,053,100	21,083,600	240,951	261,208
July .....	4,770,778	4,053,945	47,193	43,341
August .....	4,791,432	4,238,041	52,735	37,003
September ..	4,716,901	4,176,527	46,932	33,024
October .....	4,856,306	4,445,961	55,495	32,270
November .....	.....	4,403,230	.....	31,155
December .....	.....	4,547,602	.....	35,666
Year .....	.....	46,948,906	.....	473,667

\*These totals do not include charcoal pig iron. †Included in pig iron figures. ‡Revised from March to July to omit spiegeleisen production.

### Daily Average Production of Coke Pig Iron

	Per Cent Capacity		Per Cent Capacity	
	1941	1940	1941	1940
January .....	150,441	95.5	130,061	85.8
February .....	149,924	95.2	114,189	75.1
March .....	151,745	96.9	105,500	68.9
April .....	144,475	91.8	104,567	68.6
May .....	148,386	93.8	113,345	74.8
June .....	151,772	95.9	127,297	83.9
½ year.....	149,465	94.5	115,844	76.1
July .....	153,896	97.1*	130,772	86.3
August .....	154,562	97.5	136,711	90.4
September .....	157,230	98.8	139,218	92.2
October .....	156,655	98.2	143,418	94.8
November .....	.....	.....	146,774	97.1
December .....	.....	.....	146,697	97.2
Year .....	.....	.....	128,276	84.6

\*Revised for capacity as of June 30, 1941.

### Merchant Iron Made, Daily Rate

	1941	1940	1939
January ..	20,812	16,475	11,875
February ..	21,254	14,773	10,793
March .....	23,069	11,760	10,025
April .....	20,434	13,656	9,529
May .....	21,235	16,521	7,883
June .....	21,933	13,662	8,527
July .....	21,957	16,619	9,404
August .....	22,578	17,395	11,225
September ..	21,803	17,571	12,648
October .....	23,243	18,694	16,409
November ..	.....	22,792	16,642
December ..	.....	19,779	16,912

### Coming Events

Dec. 1 to 6—18th Exposition of Chemical Industries, Grand Central Palace, New York.

Dec. 3 to 5—Institute of Cooking and Heating Appliance Manufacturers, annual convention, Cincinnati.

\*Dec. 6 to 13—National Motor Truck Show, Philadelphia.

\*Tentative.

January, 1942—American Society of Heating & Ventilating Engineers, annual exposition, Philadelphia.

Jan. 12 to 16—Society of Automotive Engineers, annual meeting and engineering display, Detroit.

Jan. 20 to 22—Western Retail Implement & Hardware Association, annual exposition, Kansas City.

Feb. 23 to 28—Automotive Service Industries Show, Atlantic City, N. J.

April 14 to 17—Packaging Exposition and Conference, Hotel Astor, New York.

April 15 to 18—Electrochemical Society, spring convention, Nashville, Tenn.



## Plate Output Gains to 121.2% in September; Sheet Rate Drops

• • • The topheavy demand for plates for the defense program and the steel industry's effort to meet this demand by converting sheet rolling facilities to producing plates resulted in a sharp rise in plate output in September, and a corresponding decline in sheet output, according to American Iron and Steel Institute reports. September

plate output, as shown in the accompanying tabulation, totaled 524,434 tons, or 112.2 per cent of capacity, as compared with 535,693 tons or 99.7 per cent in the longer month of August. Sheet production in September was 996,697 tons, or 88.5 per cent, against 1,032,614 tons or 92.4 per cent in the preceding month.

Total rolled and finished steel output in September was 5,059,029 tons, or 103.6 per cent of capacity, against 5,233,987 tons or 103.4 per cent in August. Export rollings showed a gain to 560,720 tons in September, with the bulk of the gain in the semi-finished classification.

AMERICAN IRON AND STEEL INSTITUTE										September - 1941							
Capacity and Production for Sale of Iron and Steel Products										Tons							
										PRODUCTION FOR SALE—NET TONS							
										Current Month		Year to Date					
										Shipments		Shipments					
										Total	Per cent of capacity	Export	To members of the industry for conversion into further finished products	Total	Per Cent of capacity	Export	To members of the industry for conversion into further finished products
STEEL PRODUCTS	Ingot, blooms, billets, slabs, sheet bars, etc.	41	1	xxxxxx	718,889	xxx	295,881	165,599	5,023,894	xxx	1,402,575	1,512,054					
	Heavy structural shapes	9	2	5,167,200	372,266	87.8	11,213	xxxxxx	3,430,208	88.8	133,895	xxxxxx					
	Steel piling	4	3	422,000	28,090	81.1	4,177	xxxxxx	266,735	84.6	26,555	xxxxxx					
	Plates—Sheared and Universal	19	4	5,692,560	524,434	112.2	25,114	5,634	4,238,184	99.5	255,751	29,584					
	Skelp	8	5	xxxxxx	75,428	xxx	11,276	29,773	764,762	xxx	123,396	314,043					
	Rails—Standard (over 60 lbs.)	4	6	3,613,600	112,896	38.1	478	xxxxxx	1,313,650	48.6	49,304	xxxxxx					
	Light (60 lbs. and under)	6	7	302,800	12,866	51.9	3,886	xxxxxx	130,776	57.7	48,398	xxxxxx					
	All other (Incl. girder, guard, etc.)	2	8	102,000	1,166	13.9	76	xxxxxx	19,246	25.2	2,551	xxxxxx					
	Splice bar and tie plates	15	9	1,312,200	43,211	40.1	540	xxxxxx	539,962	55.0	11,457	xxxxxx					
	Bars—Merchant	40	10	xxxxxx	486,264	xxx	27,004	55,312	4,752,696	xxx	360,788	571,002					
	Concrete reinforcing—New billet	18	11	xxxxxx	150,767	xxx	18,011	xxxxxx	1,175,225	xxx	158,607	xxxxxx					
	Rerolling	18	12	xxxxxx	30,023	xxx	1,951	xxxxxx	175,604	xxx	11,748	xxxxxx					
	Cold finished—Carbon	23	13	xxxxxx	94,911	xxx	2,393	xxxxxx	936,831	xxx	18,587	xxxxxx					
	Alloy—Hot rolled	18	14	xxxxxx	144,380	xxx	5,674	19,578	1,413,345	xxx	116,374	208,954					
	Cold finished	17	15	xxxxxx	17,281	xxx	1,418	xxxxxx	137,589	xxx	23,250	xxxxxx					
	Hoops and baling bands	5	16	xxxxxx	9,132	xxx	271	xxxxxx	88,705	xxx	3,009	xxxxxx					
	TOTAL BARS	62	17	13,007,345	932,758	87.3	56,722	74,890	8,679,995	89.2	692,363	779,956					
	Tool steel bars (rolled and forged)	17	18	180,470	14,093	95.1	501	xxxxxx	111,469	82.6	5,723	xxxxxx					
	Pipe and tube—B. W.	16	19	2,242,040	155,049	84.2	6,658	xxxxxx	1,294,145	77.2	90,795	xxxxxx					
	L. W.	8	20	895,260	40,881	55.6	1,863	xxxxxx	372,832	55.7	23,013	xxxxxx					
	Electric weld	5	21	551,020	46,398	102.6	7,334	xxxxxx	407,263	98.8	22,790	xxxxxx					
	Seamless	15	22	2,997,160	179,037	72.8	10,340	xxxxxx	1,609,411	71.8	142,944	xxxxxx					
	Conduit	8	23	174,140	15,025	91.1	482	xxxxxx	118,883	91.3	3,514	xxxxxx					
	Mechanical Tubing	10	24	492,370	29,582	91.8	1,488	xxxxxx	255,328	87.0	18,632	xxxxxx					
	Wire rods	22	25	xxxxxx	121,069	xxx	27,061	16,773	1,146,645	xxx	149,968	192,266					
	Wire—Drawn	41	26	2,343,170	205,397	105.7	10,449	2,557	1,751,920	100.3	110,126	17,209					
	Nails and staples	18	27	1,153,930	62,605	66.1	5,041	xxxxxx	598,902	69.4	53,133	xxxxxx					
	Barbed and twisted	16	28	474,210	20,515	52.7	5,328	xxxxxx	205,880	58.0	46,839	xxxxxx					
	Woven wire fence	16	29	777,785	21,661	33.9	126	xxxxxx	236,504	40.7	1,664	xxxxxx					
	Bale ties	11	30	110,970	7,582	83.2	30	xxxxxx	63,517	76.5	171	xxxxxx					
	All other wire products	7	31	41,380	2,018	59.4	-	xxxxxx	15,887	51.3	3	xxxxxx					
	Fence posts	12	32	126,165	4,709	45.5	68	xxxxxx	54,480	57.7	794	xxxxxx					
	Black plate	11	33	340,030	39,035	139.8	2,185	-	324,506	127.6	28,664	43					
	Tin plate—Hot rolled	7	34	515,620	39,385	93.0	7,495	xxxxxx	250,051	64.8	34,568	xxxxxx					
	Cold reduced	11	35	3,542,040	285,966	98.3	21,226	xxxxxx	2,284,090	86.2	205,703	xxxxxx					
	Sheets—Hot rolled	30	36	xxxxxx	575,257	xxx	20,493	13,129	5,673,049	xxx	233,164	161,582					
	Galvanized	16	37	xxxxxx	122,151	xxx	5,958	xxxxxx	1,292,122	xxx	85,372	xxxxxx					
	Cold rolled	18	38	xxxxxx	211,851	xxx	6,860	xxxxxx	2,562,079	xxx	55,745	xxxxxx					
	All other	13	39	xxxxxx	57,458	xxx	1,523	xxxxxx	586,913	xxx	17,650	xxxxxx					
	TOTAL SHEETS	31	40	13,298,490	966,697	88.5	34,834	13,129	9,914,163	99.7	391,931	161,582					
	Strip—Hot rolled	24	41	3,244,680	152,097	57.1	5,927	17,833	1,533,739	63.2	58,490	190,358					
	Cold rolled	40	42	1,618,070	103,629	78.0	1,842	xxxxxx	980,428	81.0	16,550	xxxxxx					
	Wheels (car, rolled steel)	5	43	422,820	22,305	64.3	334	xxxxxx	190,409	60.2	1,458	xxxxxx					
	Axles	5	44	480,350	16,365	41.5	522	xxxxxx	140,132	39.0	2,551	xxxxxx					
	Track spikes	11	45	325,770	11,839	44.3	321	xxxxxx	128,679	52.8	1,691	xxxxxx					
All other	6	46	67,600	3,854	69.4	102	xxxxxx	34,268	67.8	1,196	xxxxxx						
TOTAL STEEL PRODUCTS	161	47	xxxxxx	5,384,817	xxx	560,720	325,788	48,436,945	xxx	4,161,156	2,197,095						
IRON PRODUCTS	Pig iron, ferro manganese and spiegel	26	48	xxxxxx	659,342	xxx	36,061	257,487	5,896,276	xxx	415,927	1,855,462					
	Ingot moulds	4	49	xxxxxx	63,888	xxx	458	xxxxxx	562,768	xxx	3,248	xxxxxx					
	Bars	12	50	172,915	9,065	63.9	27	424	73,256	56.6	651	4,012					
	Pipe and tubes	3	51	109,300	6,629	73.9	349	xxxxxx	51,213	62.6	2,131	xxxxxx					
	All other	2	52	71,000	2,347	40.3	458	-	16,594	31.2	2,966	-					
TOTAL IRON PRODUCTS (ITEMS 50 to 52)	14	53	288,715	18,041	76.1	834	424	141,065	65.5	5,748	4,012						

Total number of  
Companies included - 181

The estimated average yield of products for sale from ingots produced by the companies included above is 71.1 %, which applied to their total ingot capacity equals 59,493,000 net tons of finished rolled products. Production for sale, less shipments to members of the industry for further conversion, related to the estimated yield is as follows:

Current month	5,059,029	N.T.:	103.6	%
Year to date	45,239,848	N.T.:	101.7	%

During 1940, the companies included above represented 97.8% of the total output of finished rolled products.

# SCRAP

... MARKET ACTIVITIES AND PRICE TRENDS

## Juggling by OPM Becomes Frequent

... Under its broad authority to direct shipments, OPM has been juggling iron and steel scrap supplies very briskly recently in order

to keep defense production going. The carload diversions merely enable a continuance of hand-to-mouth operations at plants hard pressed for scrap, and do not eliminate the emergency. Major districts report the supply situation is tighter.

As a result of the desperate

## Data Required on All Transactions

... General Preference Order M-24, establishing full priority control over iron and steel scrap effective Oct. 11, provides that on or before the 15th day of each month, beginning Nov. 15, 1941, producers (producing 20 tons or more in the preceding month) must report scrap inventories, production and sales; brokers must show inventories, purchases and sales; consumers must indicate inventories, production, receipts and consumption of scrap metal.

Most persons affected by the order have the facts required in good shape. The forms are: PD-149 for scrap producers; PD-150 for consumers, and PD-151 for dealers and brokers.

# Cincinnati

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When buying a modern planer check these features:

**MAGNETIC DIAL FEEDS** (Patented)  
Individual for rail heads and side heads. Feeds selectable by 64ths from 1/64" to 1" with a twist of the wrist. Feeds may be changed at any position or direction of table travel. Heads may be fed at either end of table stroke.

**STEEL TEE SLOT INSERTS** (Patented)  
Table Tee Slots are fitted with steel inserts so that lower edges will not be damaged by bolt heads. This construction prevents pulling out of tee slots insuring perfect condition of table throughout life of machine.

### DOUBLE BRONZE NUTS

Used on all down feed and cross feed screws in all saddles and slides. This construction provides double life for all screw movements as all thrust and wear is taken by two nuts instead of one.

### EXTENDED SADDLE AND HARP

To provide extra support for the slides along with an additional long-leverage bolt circle producing maximum rigidity between saddle and harp.

Examine the Hypro Openside Planer critically. Full particulars in our new Bulletin No. 110 sent free on written request.

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CINCINNATI, OHIO

shortage in some areas, price ceilings are threatened. Overgrading has increased. The fact that the government may force the return of money collected in excess of ceiling prices is not a deterrent as the big problem is getting the scrap. Consumers refusing to pay more than the maximum have expressed chagrin at the fact that refunds not only give some buyers their scrap but at a price which was not available to those obeying government regulations.

Collection drives have been renewed with increased vigor in many sections of the nation, particularly agricultural areas. Acres of old autos are still lying in fields, however. This potential source of scrap has been stymied by the lack of equipment to junk the aged cars and the failure of price ceilings to allow for the cost of transporting these old cars to scrap yards and pay for the necessary labor to convert them into scrap bundles for shipment.

Cleveland—Republic, Otis, and Sharon Steel have appealed to OPM for aid in securing scrap and OPM has been strenuously extending all possible help. Scrap dealers as far west as Toledo and as far south as Columbus have been allocated specific tonnages to ship to Republic's mills in Massillon, Warren, Canton and Youngstown. Despite this, Republic is preparing to take off two open-hearths at



## Railroad Auction Brings High Bids

• • • Federal Court at New York last Friday refused to postpone the auction sale of the abandoned New York, Westchester & Boston Railway until after OPA formally issued its price ceilings on relaying rails. H. E. Salzberg Co., New York, was high bidder at \$298,000 on the physical property, which included 5500 tons of relaying rails and 200,000 lbs. of copper. The high lump sum bid, placed by Harry Harris, of Kearny, N. J., was \$420,000. Awards will be made soon. Scrap dealers from many cities attended, as well as Army men, railroaders and foreign government representatives.

Warren, and this is only the beginning. It is reported that mills more favorably situated have been ordered to make diversions to Republic's Youngstown plant. It is rumored OPA is considering disallowance of the 50-cent commission now being allowed to brokers, to the dealers who sell scrap from their own yards.

**Birmingham**—Although the scrap situation in this district shows no great improvement, the shortage of supplies has yet to cause an operations curtailment for major steel producers. After the first of the year the problem may reach the acute stage.

**Cincinnati**—With the supply diminishing rapidly, users of foundry scrap are becoming daily more concerned. Appeals to Washington have brought relatively no help.

**Boston**—The trade as yet has received no reports from Washington to fill out. Not much scrap is coming on the market except from shops. Foundries report the difficulty in obtaining textile and machinery cast is increasing.

**Buffalo**—The scrap situation here brightened considerably last week with dealers reporting an increase in the flow of old metal and the arrival of three lake shipments bringing to Bethlehem's dock about 15,000 tons of scrap from Duluth. At least five of the seven inactive furnaces at Bethlehem's Lackawanna plant are still down.

**St. Louis**—A leading steel mill has been reported in dire need of scrap for defense work with only sufficient for ten days' operations in piles. Other district mills have sufficient for two to four weeks. Receipts have been disappointing.

**Chicago**—Pronounced tightening of scrap supply is bringing a stage of nervous scrambling accompanied by charges of violations right and left. One of the local consumers supposed to have been ordered out of the market because of a better inventory position is definitely in

the market and bought for regular shipment last week. This producer of merchant pig iron received increased allocations of its output for the merchant classification and had to get back in the scrap market to maintain production.

**Pittsburgh**—The shortage not only has caused some steel units to shut down but has also directly affected the workings of the iron and steel scrap ceiling price order. In the past week there was an increase in the amount of No. 1 heavy melting steel shipped and accepted but handled as low phos grades commanding

a higher price by as much as \$4.75 a ton. That portion of No. 1 steel which is being sold as low phos becomes unavailable to buyers and sellers not indulging in such practices, it is said. Reports also persist that No. 1 cupola cast has been sold at \$30 to \$35 a ton, with weight juggling used as a subterfuge. Overgrading and melting scrap grades continue unabated. Some material being shipped as No. 1 steel is understood to be a poor grade of No. 2 and also to include bushelings. This bootlegging and overgrading indicates an unmistakable trend toward the blacking out of all grades of scrap other than one grade in each category.



**CAUSPLIT** is a new quick-setting cement with amazing chemical and mechanical resistance. It withstands a wide range of strong acids, alkalies and solvents at temperatures up to 350°F.

In addition, it is easy to handle and free from bothersome acid ingredients. Extensive tests have proved Causplit to be first-rate for corrosion-proof construction of industrial equipment. Actually, Causplit is a considerable improvement over Asplit, which has been widely used in many industries for more than 7 years.



**CHEMICAL PLANTS:** Causplit is the ideal cement not only because of its resistance to hydrofluoric, phosphoric and other strong acid conditions, but also because it is unaffected by alkalies, such as caustic, soda ash and hypochlorites. Causplit naturally stands up under the salts of alkalies and acids in the linings of equipment and floors.



**PULP AND PAPER MILLS:** Used in pulp digesters and bleaching systems to withstand both acids and alkalies. For instance, it is unattacked by sodium sulphite, sulphurous acid, chlorine, as well as hypochlorite, caustic soda and soda ash. Its characteristics enable it to withstand both mechanical and thermal shocks. Here again Causplit can be used for both tank and floor work.



**STEEL MILLS:** Causplit is used in the equipment for both acid and alkali cleaning of steels. It is not attacked by hydrochloric and sulphuric acids in the strengths used in the steel industry. It differs from most other acid-proof cements in that it is also resistant to hydrofluoric acid, which is used in the stainless steel industry.

Since we have manufactured acids, alkalies and other chemicals for many years, we ourselves have had considerable experience in the use of special cements for corrosion-resistant equipment. Write to us for technical help with your specific problems.



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# Iron and Steel Scrap (other than railroad scrap)

(Maximum basing point prices as revised by OPA to Sept. 26, 1941, from which shipping point prices and consumers' delivered prices are to be computed, per gross ton)

Basing Points →	Pittsburgh	Johnstown	Weirton	Steubenville	Youngstown	Warren	Sharon	Canton	Chicago	Kokomo	Bethlehem	Claymont	Coatesville	Phoenixville	Harrisburg	Sparrows Point	Buffalo	Cleveland	Toledo	Cincinnati*	Portsmouth	Middletown	Ashland	St. Louis	Detroit	Duluth	Minneapolis*	Birmingham	Chattanooga	Radford, Va.	Worcester	Bridgeport	Phillipsburg	R. I.	Los Angeles	San Francisco	Seattle	Portland	Minnequa, Colo.					
▽ GRADES																																												
No. 1 heavy melting.....	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$20.00	\$18.75	\$18.25	\$18.25	\$18.75	\$18.75	\$19.25	\$19.50	.....	\$19.50	\$17.50	\$17.85	\$18.00	\$17.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
No. 1 hyd. comp. black sheet.....	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	18.75	18.25	18.25	18.75	18.75	19.25	19.50	.....	19.50	17.50	17.85	18.00	17.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
No. 2 heavy melting.....	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Dealers' No. 1 bundles.....	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Dealers' No. 2 bundles.....	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	16.75	16.25	16.25	16.75	16.75	17.25	17.50	.....	17.50	15.50	15.85	16.00	15.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Mixed borings and turnings...	15.25	15.25	15.25	15.25	15.25	15.25	15.25	15.25	14.00	14.25	13.50	14.00	14.00	14.50	14.75	13.10	14.75	12.75	13.10	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Machine shop turnings.....	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	14.25	14.50	13.75	14.25	14.25	14.75	15.00	13.35	15.00	13.00	13.35	15.50	15.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Shoveling turnings.....	16.50	16.50	16.50	16.50	16.50	16.50	16.50	16.50	15.25	15.50	14.75	15.25	15.25	15.75	16.00	14.35	16.00	14.00	14.35	16.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
No. 1 busheling.....	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	18.25	17.75	17.75	18.25	18.25	18.75	19.00	.....	19.00	17.00	17.35	17.50	16.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
No. 2 busheling.....	15.50	15.50	15.50	15.50	15.50	15.50	15.50	15.50	14.25	13.75	13.75	14.25	14.25	14.75	15.00	.....	15.00	13.00	13.35	13.50	12.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Cast iron borings.....	15.75	15.75	15.75	15.75	15.75	15.75	15.75	15.75	14.50	14.00	14.00	14.50	14.50	15.00	15.25	13.60	15.25	13.25	13.60	13.75	12.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Uncut structural, plate scrap...	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	.....	18.50	16.50	16.85	17.00	16.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
No. 1 cupola.....	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	20.00	20.00	22.50	23.00	22.00	20.00	22.00	.....	21.00	20.00	20.35	19.00	20.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Heavy breakable cast.....	19.50	19.50	19.50	19.50	19.50	19.50	19.50	19.50	18.50	18.50	21.00	21.50	21.00	18.50	20.50	.....	19.50	18.50	18.85	17.50	18.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Stove plate.....	19.00	19.00	19.00	19.00	19.00	19.00	19.00	19.00	17.00	16.00	18.00	18.50	18.00	19.00	18.00	15.60	17.50	17.00	14.10	16.00	17.00	17.50	18.00	17.50	18.00	17.50	14.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Low phos. billet, bloom crops.....	25.00	25.00	25.00	25.00	25.00	25.00	25.00	25.00	23.75	23.75	23.25	23.75	23.75	24.25	24.50	.....	23.50	22.50	22.85	23.00	22.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Low phos. bar crops, smaller.....	23.00	23.00	23.00	23.00	23.00	23.00	23.00	23.00	21.75	21.75	21.25	21.75	21.75	22.25	22.50	.....	21.50	20.50	20.85	21.00	20.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Low phos. pu'ch'gs, plate scrap <sup>1</sup>	24.75	24.75	24.75	24.75	24.75	24.75	24.75	24.75	21.75	21.75	21.25	21.75	21.75	22.25	22.50	.....	21.50	20.50	20.85	21.00	20.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Machinery cast, cupola size <sup>2</sup> .....	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	21.00	21.00	23.50	24.00	23.50	21.00	23.00	.....	22.00	21.00	21.35	20.00	21.00	21.50	22.00	22.50	23.00	23.50	19.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
No. 1 mach. cast, drop-broken, 150 lb. and under.....	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	.....	22.50	21.50	21.85	20.50	21.50	22.00	22.50	23.00	23.50	19.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Clean auto cast.....	22.50	22.50	22.50	22.50	22.50	22.50	22.50	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	.....	22.50	21.50	21.85	20.50	21.50	22.00	22.50	23.00	23.50	19.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Punchings and plate scrap <sup>3</sup> .....	23.75	23.75	23.75	23.75	23.75	23.75	23.75	23.75	20.75	20.75	20.25	20.75	20.75	21.25	21.50	.....	20.50	19.50	19.85	20.00	19.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Punchings and plate scrap <sup>4</sup> .....	22.75	22.75	22.75	22.75	22.75	22.75	22.75	22.75	19.75	19.75	19.25	19.75	19.75	20.25	20.50	.....	19.50	18.50	18.85	19.00	18.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Heavy axle, forge turnings.....	21.25	21.25	21.25	21.25	21.25	21.25	21.25	21.25	18.25	18.25	17.75	18.25	18.25	18.75	19.00	.....	18.00	17.00	17.35	17.50	16.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Medium h'vy el f'ce turnings.....	19.75	19.75	19.75	19.75	19.75	19.75	19.75	19.75	16.75	16.75	16.25	16.75	16.75	17.25	17.50	.....	16.50	15.50	15.85	16.00	15.00	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	

<sup>1</sup> This grade is 3/4-in. and heavier, cut 12 in. and under. <sup>2</sup> May include clean agricultural cast. <sup>3</sup> Under 3/4 to 1/4-in., cut 12 in. and under. <sup>4</sup> Under 3/4-in. to No. 12 gage, cut 12 in. and under. <sup>5</sup> Youngstown, Warren, Sharon and Canton are not basing points on this grade. <sup>6</sup> Middletown and Cincinnati price for this grade is \$15. <sup>7</sup> Includes Newport, Ky. Shipping point price within Cincinnati basing point may be 80c. a ton below basing point price listed above for all grades except the six cast grades. <sup>8</sup> Minneapolis and St. Paul are basing points on following grades only: No. 1 cupola, heavy breakable cast, stove plate, machinery cast cupola size, No. 1 machinery cast drop broken, clean auto cast.

## Railroad Scrap (Per gross ton, delivered consumers' plants located on line of railroad originating scrap)

Basing Points ➤		Pittsburgh	Sharon, Pa.	Wheeling	Steubenville	Youngstown	Canton	Chicago	Kokomo	Philadelphia	Wilmington	Sparrows Point	Cleveland	Buffalo	Portsmouth	Middletown	Ashland	St. Louis	Kansas City	Cincinnati	Detroit	Duluth	Birmingham	Los Angeles	San Francisco	Seattle
▼ GRADES																										
No. 1 heavy melting.....		\$21.00						\$19.75	\$19.25	\$19.75	\$19.75	\$19.75	\$20.50	\$20.25	\$20.50			\$18.50	\$17.00	\$20.50	\$18.85	\$19.00	\$18.00		\$15.50	
Scrap rails.....		22.00						20.75	20.25	20.75	20.75	20.75	21.50	21.25	21.50			19.50	18.00	21.50	19.85	20.00	19.00		16.50	
Re-rolling rails.....		23.50						22.25	21.75	22.25	22.25	22.25	23.00	22.75	23.00			21.00	19.50	23.00	21.35	21.50	20.50		18.00	
Scrap rails 3 ft. and under.....		24.00						22.75	22.25	22.75	22.75	22.75	23.50	23.25	23.50			21.50	20.00	23.50	21.85	22.00	21.00		18.50	
Scrap rails 2 ft. and under.....		24.25						23.00	22.50	23.00	23.00	23.00	23.75	23.50	23.75			21.75	20.25	23.75	22.10	22.25	21.25		18.75	
Scrap rails 18 in. and under.....		24.50						23.25	22.75	23.25	23.25	23.25	24.00	23.75	24.00			22.00	20.50	24.00	22.35	22.50	21.50		19.00	

Railroads not operating in a basing point may sell re-rolling rails f.o.b. their lines at average price of their sales from Sept. 1, 1940, to Jan. 31, 1941. Re-rolling mills may absorb all transportation charges necessary to obtain such rails. Maximum prices for scrap rails and re-rolling rails from mines, logging camps and similar sources need not be sold for less than \$13.50 a gross ton for scrap rails and \$15 for re-rolling material at shipping point.

Where the railroad originator of the scrap operates in two or more of the basing points named, the highest of the maximum prices established for such basing points shall be the maximum price of the scrap delivered to a consumer's plant at any point on the railroad's line, except that switching charges of 84c. per gross ton shall be subtracted from the maximum prices of scrap originating from railroads operating in Chicago and sold for consumption outside Chicago.

## Explanatory Notes

(A basing point includes its switching district)

**MAXIMUM PRICE** at which any grade of scrap may be delivered to consumer's plant, wherever located, is the shipping point price, plus actual transportation from the shipping point to consumer. Where shipment is by water, actual handling charges at the dock of not more than 75c. a gross ton may be included as part of transportation charges. In no case may this maximum price exceed by more than \$1 prices (for material other than railroad scrap) for the basing point nearest the consumer.

**COMPUTING SHIPPING POINT PRICE:** A shipping point is the point from which the scrap is to be shipped to a consumer. A shipping point price is computed as follows: (a) For Shipping Points located within a basing point.—The price established for the basing point in which the shipping point is located, is determined. Then deduct from this the actual costs involved in transporting scrap from the shipping point to the consumer's plant within the basing point which is nearest, in terms of transportation costs, to the shipping point; (b) For shipping points located outside a basing point.—The price established for the nearest basing point, in terms of transportation charges, to the shipping point is determined. Deduct from this the lowest established charge for transporting scrap from the shipping point to such basing point. **Exceptions:** (1) The shipping point price at any shipping point in New England, of those grades of scrap for which no prices are listed above shall be the Johnstown basing point price, minus the all-rail transportation costs from the New England shipping point to Johnstown; (2) Shipping point prices for New York City, Brooklyn, New York, and New Jersey shall be computed from the Bethlehem, Pa., basing point.

**GULF PORT PRICES:** Scrap shipped from Tampa, Pensacola, Gulfport, Mobile, New Orleans, Lake Charles, Port Arthur, Beaumont, Galveston, Texas City, Houston and Corpus Christi, has a maximum shipping point price not exceeding \$14 a gross ton, f.o.b. cars, for No. 1 heavy melting steel. For other grades, the differentials established for Birmingham apply.

**REMOTE SCRAP:** Defined as all grades of scrap listed in table above (exclusive of railroad scrap) located in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas and Oklahoma. Maximum shipping point price of remote scrap is \$12 a gross ton, for No. 2 heavy melting steel



# ... Comparison of Prices

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*)

(Prices Are F.O.B. Major Basing Points)

Minneapolis,  
Minn.,  
11.75  
12.00

\$16.50  
16.50  
15.50  
14.50  
13.00  
12.00  
12.25  
15.50

	Nov. 11, 1941	Nov. 3, 1941	Oct. 14, 1941	Nov. 12, 1940
<b>Flat Rolled Steel:</b> (Cents Per Lb.)				
Hot rolled sheets.....	2.10	2.10	2.10	2.10
Cold rolled sheets.....	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip.....	2.10	2.10	2.10	2.10
Cold rolled strip.....	2.80	2.80	2.80	2.80
Plates.....	2.10	2.10	2.10	2.10
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00

<b>Tin and Terne Plate:</b> (Dollars Per Base Box)				
Tin plate.....	\$5.00	\$5.00	\$5.00	\$5.00
Manufacturing ternes ...	4.30	4.30	4.30	4.30

<b>Bars and Shapes:</b> (Cents Per Lb.)				
Merchant bars.....	2.15	2.15	2.15	2.15
Cold finished bars.....	2.65	2.65	2.65	2.65
Alloy bars.....	2.70	2.70	2.70	2.70
Structural shapes.....	2.10	2.10	2.10	2.10
Stainless bars (No. 302).	24.00	24.00	24.00	24.00

<b>Wire and Wire Products:</b> (Cents Per Lb.)				
Plain wire.....	2.60	2.60	2.60	2.60
Wire nails.....	2.55	2.55	2.55	2.55

<b>Rails:</b> (Dollars Per Gross Ton)				
Heavy rails.....	\$40.00	\$40.00	\$40.00	\$40.00
Light rails.....	40.00	40.00	40.00	40.00

<b>Semi-Finished Steel:</b> (Dollars Per Gross Ton)				
Rerolling billets.....	\$34.00	\$34.00	\$34.00	\$34.00
Sheet bars.....	34.00	34.00	34.00	34.00
Slabs.....	34.00	34.00	34.00	34.00
Forging billets.....	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00

<b>Wire Rods and Skelp:</b> (Cents Per Lb.)				
Wire rods.....	2.00	2.00	2.00	2.00
Skelp (grvd).....	1.90	1.90	1.90	1.90

	Nov. 11, 1941	Nov. 3, 1941	Oct. 14, 1941	Nov. 12, 1940
<b>Pig Iron:</b> (Per Gross Ton)				
No. 2 fdy., Philadelphia..	\$25.84	\$25.84	\$25.84	\$24.84
No. 2, Valley furnace....	24.00	24.00	24.00	23.00
No. 2, Southern Cin'ti....	24.06	24.06	24.06	23.06
No. 2, Birmingham.....	20.38	20.38	20.38	19.38
No. 2, foundry, Chicago†.	24.00	24.00	24.00	23.00
Basic, del'd eastern Pa...	25.34	25.34	25.34	24.34
Basic, Valley furnace....	23.50	23.50	23.50	22.50
Malleable, Chicago†....	24.00	24.00	24.00	23.00
Malleable, Valley.....	24.00	24.00	24.00	23.00
L. S. charcoal, Chicago..	31.34	31.34	31.34	30.34
Ferromanganese†.....	120.00	120.00	120.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. †For carlots at seaboard.

<b>Scrap:</b> (Per Gross Ton)				
Heavy melt'g steel, Pgh.	\$20.00	\$20.00	\$20.00	\$21.50
Heavy melt'g steel, Phila.	18.75	18.75	18.75	20.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	20.00
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	18.00
Low phos. plate, Youngs'n	23.00	23.00	23.00	24.00
No. 1 cast, Pittsburgh....	22.00	22.00	22.00	22.25
No. 1 cast, Philadelphia..	24.00	24.00	24.00	22.75
No. 1 cast, Ch'go*.....	21.00	21.00	21.00	17.75

\*Changed to gross ton basis, April 3, 1941.

<b>Coke, Connellsville:</b> (Per Net Ton at Oven)				
Furnace coke, prompt....	\$6.125	\$6.125	\$6.125	\$5.25
Foundry coke, prompt....	6.875	6.875	6.875	5.75

<b>Non-Ferrous Metals:</b> (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.*..	12.00	12.00	12.00	12.00
Copper, Lake, New York.	12.00	12.00	12.00	12.00
Tin (Straits), New York.	52.00	52.00	52.00	51.00
Zinc, East St. Louis.....	8.25	8.25	8.25	7.25
Lead, St. Louis.....	5.70	5.70	5.70	5.65
Antimony (Asiatic), N. Y..	16.50	16.50	16.50	16.50

\*Mine producers only.

The various basing points for finished and semi-finished steel are listed in detailed price tables, pages 142-148. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

# ... Composite Prices

FINISHED STEEL		PIG IRON		SCRAP STEEL	
Nov. 11, 1941.....	2.30467c. a Lb.....	.....\$23.61 a Gross Ton.....	.....\$19.17 a Gross Ton.....	.....\$19.17 a Gross Ton.....	.....\$19.17 a Gross Ton.....
One week ago.....	2.30467c. a Lb.....	.....\$23.61 a Gross Ton.....	.....\$19.17 a Gross Ton.....	.....\$19.17 a Gross Ton.....	.....\$19.17 a Gross Ton.....
One month ago.....	2.30467c. a Lb.....	.....\$23.61 a Gross Ton.....	.....\$19.17 a Gross Ton.....	.....\$19.17 a Gross Ton.....	.....\$19.17 a Gross Ton.....
One year ago.....	2.30467c. a Lb.....	.....\$22.61 a Gross Ton.....	.....\$20.75 a Gross Ton.....	.....\$20.75 a Gross Ton.....	.....\$20.75 a Gross Ton.....

High		Low		High		Low		High		Low	
1941.....	2.30467c.,	2.30467c.,		\$23.61, Mar. 20	\$23.45, Jan. 2	\$22.00, Jan. 7	\$19.17, Apr. 10				
1940.....	2.30467c., Jan. 2	2.24107c., Apr. 16		23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9				
1939.....	2.35367c., Jan. 3	2.26689c., May 16		22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16				
1938.....	2.58414c., Jan. 4	2.27207c., Oct. 18		23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7				
1937.....	2.58414c., Mar. 9	2.32263c., Jan. 4		23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.92, Nov. 10				
1936.....	2.32263c., Dec. 28	2.05200c., Mar. 10		19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9				
1935.....	2.07642c., Oct. 1	2.06492c., Jan. 8		18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29				
1934.....	2.15367c., Apr. 24	1.95757c., Jan. 2		17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25				
1933.....	1.95578c., Oct. 3	1.75836c., May 2		16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3				
1932.....	1.89196c., July 5	1.83901c., Mar. 1		14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5				
1931.....	1.99629c., Jan. 13	1.86586c., Dec. 29		15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29				
1930.....	2.25488c., Jan. 7	1.97319c., Dec. 9		18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9				
1929.....	2.31773c., May 28	2.26498c., Oct. 29		18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3				

A weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip. These products represent 78 per cent of the United States output. This revised index recapitulated to 1929 in the Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

# Prices of Finished Iron and Steel...

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	DELIVERED TO		
													Detroit	New York	Phila- delphia
<b>SHEETS</b>															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled <sup>1</sup>	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes <sup>2</sup>	3.80¢		3.80¢									4.55¢			
<b>STRIP</b>															
Hot rolled <sup>3</sup>	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled <sup>4</sup>	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)					2.90¢	3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)					3.05¢	3.31¢	
<b>TIN PLATE</b>															
Standard cokes, base box	\$5.00	\$5.00	\$5.00						\$5.10						\$5.32
<b>BLACK PLATE</b>															
29 gage <sup>5</sup>	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ ( <sup>10</sup> )			3.37¢
<b>TERNES M'FG.</b>															
Special coated, base box	\$4.30	\$4.30	\$4.30						\$4.40						
<b>BARS</b>															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel <sup>6</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail) <sup>7</sup>	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.50¢	2.55¢	2.25¢		2.47¢
Cold finished <sup>8</sup>	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢		(Detroit = 2.70¢)						3.01¢	2.97¢
Alloy, hot rolled	2.70¢	2.70¢				2.70¢	(Bethlehem, Massillon, Canton = 2.70¢)						2.80¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.45¢		
<b>PLATES</b>															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢( <sup>11</sup> )		2.45¢	2.65¢	2.25¢	2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢				(Coatesville = 3.50¢)					3.95¢	4.15¢		3.70¢	3.37¢
<b>SHAPES</b>															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem = 2.10¢)				2.45¢	2.75¢		2.27¢	2.215¢
<b>SPRING STEEL C-R</b>															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester = 3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester = 4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester = 6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester = 8.55¢)								
<b>WIRE<sup>9</sup></b>															
Bright	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)					3.10¢			2.92¢
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester = 2.70¢)					3.10¢			2.92¢
Spring	3.20¢	3.20¢		3.20¢			(Worcester = 3.30¢)					3.80¢			3.52¢
<b>PILING</b>															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.72¢
<b>IRON BARS</b>															
Common		2.25¢			(Terre Haute, Ind. = 2.15¢)										
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

<sup>1</sup> Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. <sup>2</sup> Unassorted 8-lb. coating. <sup>3</sup> Widths up to 12 in. <sup>4</sup> Carbon 0.25 per cent and less. <sup>5</sup> Applies to certain width and length limitations. <sup>6</sup> For merchant trade. <sup>7</sup> Straight lengths as quoted by distributors. <sup>8</sup> Also shafting. For quantities of 20,000 to 39,999 lb. <sup>9</sup> Carload lot to manufacturing trade. <sup>10</sup> Boxed. <sup>11</sup> Ship plates only.



## SEMI-FINISHED STEEL

**Billets, Blooms and Slabs**

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2 higher; f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton

Rerolling .....\$34.00  
Forging quality ..... 40.00

**Shell Steel**

Basic open hearth shell steel, f.o.b. Pittsburgh and Chicago.

Per Gross Ton

3 in. to 12 in.....\$52.00  
12 in. to 18 in..... 54.00  
18 in. and over..... 56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

**Sheet Bars**

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open hearth or bessemer.....\$34.00

**Skelp**

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared 1.90c.

**Wire Rods**

(No. 5 to 9/32 in.)

Per Lb.

Pittsburgh, Chicago, Cleveland. 2.00c.  
Worcester, Mass. .... 2.10c.  
Birmingham ..... 2.00c.  
San Francisco ..... 2.50c.  
Galveston ..... 2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

**Alloy Steel Blooms, Billets and Slabs**

Per Gross Ton

Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem .....\$54.00

**TOOL STEEL**

(F.o.b. Pittsburgh)

Base per Lb.

High speed ..... 67c.  
High-carbon-chromium ..... 43c.  
Oil hardening ..... 24c.  
Special carbon ..... 22c.  
Extra carbon ..... 18c.  
Regular carbon ..... 14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

## PIG IRON

All prices set in bold face type are maxima established by OPACS on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorous	Charcoal
Boston.....	\$25.50	\$25.00	\$26.50	\$26.00	.....	.....
Brooklyn.....	27.50	.....	.....	28.00	.....	.....
Jersey City.....	26.53	26.03	27.53	27.03	.....	.....
Philadelphia.....	25.84	25.34	26.84	26.34	.....	.....
Bethlehem, Pa.....	\$25.00	\$24.50	\$26.00	\$25.50	.....	.....
Everett, Mass.....	25.00	24.50	26.00	25.50	.....	.....
Swedeland, Pa.....	25.00	24.50	26.00	25.50	.....	.....
Steeltown, Pa.....	.....	24.50	.....	.....	\$29.50	.....
Birdsboro, Pa.....	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.....	25.00	24.50	.....	.....	.....	.....
Erie, Pa.....	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.....	24.00	23.50	24.50	24.00	.....	.....
Sharpville, Pa.*.....	24.00	23.50	24.50	24.00	.....	.....
Buffalo.....	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati.....	24.44	24.61	.....	25.11	.....	.....
Canton, Ohio.....	25.39	24.89	25.89	25.39	.....	.....
Mansfield, Ohio.....	25.94	25.44	26.44	25.94	.....	.....
St. Louis.....	24.50	24.02	.....	.....	.....	.....
Chicago.....	24.00	23.50	24.50	24.00	.....	\$31.34
Granite City, Ill.....	24.00	23.50	24.50	24.00	.....	.....
Cleveland.....	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio.....	24.00	23.50	.....	24.00	.....	.....
Toledo.....	24.00	23.50	24.50	24.00	.....	.....
Youngstown*.....	24.00	23.50	24.50	24.00	.....	.....
Detroit.....	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fc.....	.....	.....	.....	.....	.....	\$28.00
Lyles, Tenn. fc.†.....	.....	.....	.....	.....	.....	33.00
St. Paul.....	26.63	.....	27.13	26.63	.....	.....
Duluth.....	24.50	.....	25.00	24.50	.....	.....
Birmingham.....	20.38	19.00	25.00	.....	.....	.....
Los Angeles.....	27.50	.....	.....	.....	.....	.....
San Francisco.....	27.50	.....	.....	.....	.....	.....
Seattle.....	27.50	.....	.....	.....	.....	.....
Provo, Utah.....	22.00	.....	.....	.....	.....	.....
Montreal.....	27.50	27.50	.....	28.00	.....	.....
Toronto.....	25.50	25.50	.....	26.00	.....	.....

## GRAY FORGE IRON

Valley or Pittsburgh furnace..... \$23.50

\*Pittsburgh Coke & Iron Co. (Sharpville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of basic grade (1.75 per cent to 2.25 per cent).

Phosphorous Differentials: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

†Price shown is for low-phosphorous iron; high-phosphorous sells for \$28.50 at the furnace.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

## WAREHOUSE PRICES

	Pittsburgh	Chicago	Cleveland	Philadelphia	New York	Detroit	Buffalo	Boston	Birmingham	St. Louis	St. Paul	Milwaukee	Los Angeles
Sheets, hot rolled.....	\$3.35	\$3.25	\$3.35	\$3.75	\$3.58	\$3.43	\$3.25	\$3.71	\$3.45	\$3.39	\$3.30	\$3.38	\$5.10
Sheets, cold rolled.....	.....	4.10	4.05	4.05	4.60	4.30	4.30	3.68	.....	4.24	4.35	4.23	7.30
Sheets, galvanized.....	4.65	4.85	4.75	5.00	5.00	4.84	4.75	5.11	4.75	4.99	4.75	4.98	6.30
Strip, hot rolled.....	3.60	3.60	3.50	3.95	3.96	3.68	3.82	4.06	3.70	3.74	3.65	3.73	.....
Strip, cold rolled.....	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46	.....	3.61	3.83	3.54	.....
Plates.....	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.95
Structural shapes.....	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.95
Bars, hot rolled.....	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	**4.15
Bars, cold finished.....	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300.....	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.50	.....	7.72	7.45	7.58	10.35
Bars, ht. rld. SAE 3100.....	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	.....	6.02	6.00	5.88	9.35
Bars, cd. drn. SAE 2300.....	8.40	8.40	8.40	8.56	8.84	8.70	8.40	8.63	.....	8.77	8.84	8.63	11.35
Bars, cd. drn. SAE 3100.....	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	.....	7.12	7.44	6.98	10.35

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.0971 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 24 ga.—1 to 1499 lb. Extras for size, quality, etc., apply on above quotations.

\*12 gage and heavier, \$3.43. \*\*Over 4 in. wide and over 1 in. thick, \$4.95.

CORROSION AND HEAT-  
RESISTING STEELS

(Per lb. base price, f.o.b. Pittsburgh)

## Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

## Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F. Billets	15.73c.	16.15c.	19.13c.	23.38c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	25.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

## Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

\*Includes annealing and pickling.

## ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
*Motor	4.95c.
*Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 75c. per 100 lb.

\*In some instances motor grade is referred to as dynamo grade and dynamo grade is referred to as dynamo special.

## ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

## BOLTS, NUTS, RIVETS, SET SCREWS

## Bolts and Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago

Per Cent Off List

## Machine and Carriage Bolts:

6½ in., shorter and smaller	65½
6 x ½ in., and shorter	63½
6 in. by ¾ to 1 in. and shorter	61
1½ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

## Nuts, Cold Punched or Hot Pressed:

(hexagon or square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1½ to 1½ in. inclusive	57
1½ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

	Semi-Fin.	Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	62			
½ in. and smaller	62			
½ in. through 1 in.	60			
9/16 to 1 in.	59			
1½ in. through 1½ in.	57		58	
1½ in. and larger	56			

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	71 and 10
Stove bolts in packages, with nuts attached	71
Stove bolts in bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

## Large Rivets

(½ in. and larger)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.75
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## Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5
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## Cap and Set Screws

Per Cent Off List

Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

## WIRE PRODUCTS

(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	\$2.55
Coated nails	2.55
Cut nails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	\$3.05
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Base Column

Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

\*15½ gage and heavier. †On \$0-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

## BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes

Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

	Seamless	Lap Weld,	
	Cold	Hot	Hot
	Drawn	Roll	Roll
	\$	\$	\$
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

STEEL AND WROUGHT IRON  
PIPE AND TUBING

## Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills (F.o.b. Pittsburgh only on wrought pipe)

Base Price = \$200 Per Net Ton

## Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

## Wrought Iron (Butt Weld)

½ in.	24	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

## Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

## Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

## Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

## Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

## Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

## Wrought Iron (Same as above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or \$2 a ton higher on all butt weld 8 in. and smaller.

## CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago	\$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

## FUEL OIL

No. 3, f.o.b. Bayonne, N. J.	5.20c.
No. 6, f.o.b. Bayonne, N. J.	3.21c.
No. 6 Bur. Stds., del'd Chicago	4.50c.
No. 3 distillate del'd Cleveland	6.50c.
No. 4 indus., del'd Cleveland	6.00c.
No. 6 indus., del'd Cleveland	5.00c.



# Here's an amazing young fellow...



**a tool and die maker who  
has used Disston Steels for  
more than half a century!**

**W**hen Disston made high grade steels in crucibles, long before the advent of electric furnaces, George Metzger, who has worked for Disston 71 years, started hardening the dies and tools used to make Disston Saws.

He was working with Disston Tool Steels in 1906... the year when Disston cast the first commercial heat of electric saw steel in America. He watched Disston's metallurgical methods being improved...larger electric furnaces installed...new alloy steels developed, carefully controlled in chemical analysis, grain size and working qualities.

George Metzger is still active in 1941...after working with Disston Tool Steels all these years! And he relies today upon such Disston Steels as Mansil...which he

knows he can handle easily in forging, machining, grinding and heat treatment...Mansil, which George has seen *proved* in long production runs, used for dies, punches and master tools.

*Help for tool makers:* Disston metallurgical engineers will be glad to help you in selecting the best tool steels for each job...for more "mileage" per tool. Also, there's valuable information in the 73-page catalog, "Disston Tool Steels." If you haven't received your copy write today to Henry Disston & Sons, Inc., 1119 Tacony, Philadelphia, Pa.

HENRY DISSTON & SONS, INC., 1119 Tacony, Phila., Pa.

I don't have a copy of your catalog, "Disston Tool Steels." Please send me one, without obligation, today.

Name \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_



## DISSTON TOOL STEELS

### Mansil—answer to a tool designer's prayer

Whenever Disston designers are planning a new die or punch, Mansil receives first consideration. Mansil Die Steel is a deep hardening, non-deforming, uniform manganese-chromium-tungsten alloy steel. Use it for intricate tools and wherever varied cross sections must be deeply hardened. Mansil shows minimum distortion and excellent machinability. All sorts of dies, broaches, gauges, taps, hobs, reamers and master tools give more "mileage" when made of Mansil.

# PRICES

## FERROALLOYS

### Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads).....\$120.00

### Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....\$36.00  
Domestic, 26 to 28%..... 49.50

### Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk).....\$74.50  
50% (ton lots, packed)..... 87.00  
75% (carload lots, bulk).....135.00  
75% (ton lots, packed).....151.00

### Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)

F.O.B. Jackson, Ohio.....\$29.50\*  
Buffalo .....\$30.75\*

For each additional 0.50% silicon add \$1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add \$1 a ton for 0.75% phosphorus or over.

\*Official OPACS price established June 24.

### Bessemer Ferrosilicon

Prices are \$1 a ton above Silvery Iron quotations of comparable analysis.

### Ferrochrome

(Per Lb. Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon.....13.00c.  
2 carbon .....19.50c.  
1 carbon .....20.50c.  
0.10 carbon .....22.50c.  
0.06 carbon .....23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

### Silico-Manganese

(Per Gross Ton, Delivered, Lump Size, Bulk, on Contract)

3 carbon .....\$113.00\*  
2.50 carbon ..... 118.00\*  
2 carbon ..... 123.00\*  
1 carbon ..... 133.00\*

### Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload.... \$2.00

Ferrotungsten, 100 lb. and less \$2.25

Ferrovandium, contract, per lb. contained V, del'd \$2.70 to \$2.90†

Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots..... \$2.25†

Ferrocobaltitanium, 15-18 Ti, 7-8 C, f.o.b. furnace, carload, contract, net ton.....\$142.50

Ferrocobaltitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload, contract, net ton.....\$157.50

Ferrophosphorus, electric or blast furnace material, carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage freight, equalized with Rockdale, Tenn., gross ton..... \$58.50

Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage, freight equalized with Nashville, gross ton..... \$75.00

Ferromolybdenum, per lb. Mo, f.o.b. furnace ..... 95c.

Calcium molybdate, per lb. Mo, f.o.b. furnace..... 80c.

Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.... 80c.

Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa. 80c.

\*Spot prices are \$5 per ton higher.

†Spot prices are 10c. per lb. of contained element higher.

## ORES

### Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton

Old range, bessemer, 51.50.... \$4.75  
Old range, non-bessemer, 51.50 4.60  
Mesaba, bessemer, 51.50..... 4.60  
Mesaba, non-bessemer, 51.50... 4.45  
High phosphorus, 51.50..... 4.35

### Foreign Ores\*

(C.i.f. Philadelphia or Baltimore, Exclusive of Duty)

Per Unit

African, Indian, 44-48 Mn. .65c. to 66c.  
African, Indian, 49-51 Mn. .67c. to 69c.

### Furnace

Per Net Ton

Connellsville, prompt ...\$6.00 to \$6.25

### Foundry

Connellsville, prompt ...\$6.75 to \$7.00

\*Maximum coke prices established by OPA became effective Oct. 1, 1941. A complete schedule of the ceiling prices was published in THE IRON AGE, Sept. 25, p. 94B. †F.O.B. oven.

## COKE\*

By-product, Chicago .....\$12.25

By-product, New England.....\$13.75

By-product, Newark..\$12.40 to \$12.95

By-product, Philadelphia .....\$12.38

By-product, Cleveland .....\$12.30

By-product, Cincinnati .....\$11.75

By-product, Birmingham .....\$8.50†

By-product, St. Louis.....\$12.02

By-product, Buffalo .....\$12.50

\*Importations no longer readily available. Prices shown are nominal.

## RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton.....\$40.00  
Angle bars, 100 lb..... 2.70

(F.o.b. Basing Points) Per Gross Ton

Light rails (from billets).....\$40.00  
Light rails (from rail steel)... 39.00

Base per Lb.

Cut spikes ..... 3.00c.

Screw spikes ..... 5.15c.

Tie plates, steel..... 2.15c.

Tie plates, Pacific Coast..... 2.30c.

Track bolts, heat treated, to railroads ..... 5.00c.

Track bolts, jobbers discount.. 63-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneapqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

## FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5

f.o.b. Kentucky and Illinois

mines, all rail.....\$22.00 to \$23.00

Domestic, f.o.b. Ohio River land-

ing barges .....22.00 to 23.00

No. 2 lump, 85-5 f.o.b. Kentucky

and Illinois mines...22.00 to 23.00

Foreign, 85% calcium fluoride,

not over 5% Si, c.i.f. Atlantic

ports, duty paid.....Nominal

Domestic No. 1 ground bulk, 96

to 98%, calcium fluoride, not

over 2½% silicon, f.o.b. Illi-

nois and Kentucky mines.... 31.00

As above, in bags, f.o.b. same

mines ..... 32.60

## REFRACTORIES

(F.o.b. Works)

Fire Clay Brick Per 1000

Super-duty brick, St. Louis...\$64.60

First quality, Pennsylvania,

Maryland, Kentucky, Missouri

and Illinois ..... 51.30

First quality, New Jersey..... 56.00

Second quality, Pennsylvania,

Maryland, Kentucky, Missouri

and Illinois ..... 46.55

Second quality, New Jersey.... 51.00

No. 1, Ohio..... 43.00

Ground fire clay, net ton..... 7.60

Silica Brick

Pennsylvania .....\$51.30

Chicago District ..... 58.90

Birmingham ..... 51.30

Silica cement, net ton (Eastern) 9.00

Chrome Brick Per Net Ton

Standard, f.o.b. Baltimore, Plym-

outh Meeting and Chester...\$54.00

Chemically bonded, f.o.b. Balti-

more, Plymouth Meeting and

Chester, Pa. .... 54.00

Magnesite Brick

Standard f.o.b. Baltimore and

Chester .....\$76.00

Chemically bonded, f.o.b. Balti-

more ..... 65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and

Chester in sacks.....\$44.00

Domestic, f.o.b. Chewelah, Wash.

(in bulk) ..... 22.00





## MACHINES CAN'T TALK —BUT WORKMEN CAN!

Ask skilled operators who work with Continental SUPERIOR wire what they think of it. You will find they agree with hundreds of workmen in other plants that this wire has the working qualities they like. It handles and fabricates uniformly . . . keeps production up—and costs down.

Continental SUPERIOR wire is produced in many special shapes as well as round, and in sizes from 34 gauge to  $\frac{5}{8}$  inch. Continental's experience in manufacturing *wire for a thousand uses* makes it possible to provide the exact type of wire to assure smoother, faster production in almost any plant.

**CONTINENTAL STEEL CORPORATION, Kokomo, Indiana**  
(The Superior Sheet Steel Co., Canton, Ohio — A Subsidiary)



# CONTINENTAL

## STEEL CORPORATION

**SHEETS:** Black, Galvanized, Copperior, Hot and Cold Rolled, Special Coated, Long Terns, etc.

**WIRE:** Bright Basic, Annealed, KONIK, Coppered, Tinned, Special Manufacturer's, etc.

# SALES POSSIBILITIES

... CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

## North Atlantic States

• **Union Mfg. Co.**, 296 Church Street, New Britain, Conn., overhead trolleys, hoists, etc., has asked bids on general contract for two one-story additions for expansion in forge shop. Cost close to \$45,000 with equipment. Delbert K. Perry, 17 Court Street, is architect.

**Worthington Pump & Machinery Corp.**, Appleton and Canal Streets, Holyoke, Mass., has let general contract to United Engineers & Constructors, Inc., 1401 Arch Street, Philadelphia, for two one-story additions, 300 x 430 ft., and 71 x 300 ft., respectively, for new welding shop and machine shop, in order noted, for production of anti-aircraft gun mounts for government. Cost over \$500,000 with equipment.

**Pratt & Whitney Division**, United Aircraft Corp., East Hartford, Conn., aircraft engines and parts, has let general contract to Wadhams, May & Carey Co., 15 Lewis Street, Hartford, for four one-story additions for new dynamometer building, experimental hangar and other service. Cost over \$225,000 with equipment. Albert Kahn Associated Architects & Engineers, Inc., Detroit, is architect and engineer.

**Narragansett Electric Co.**, 51 Westminster Street, Providence, will build new steam-electric generating station at Thompson's Corner, Westerly, R. I., fronting on Pawcatuck River. Cost about \$2,500,000 with turbine-generators, high-pressure boilers and auxiliary equipment.

**Zenith Products, Inc.**, 58 Chestnut Street, West Newton, Mass., pumping machinery and parts, plans new plant near California and Los Angeles Streets, Allston Park district, Nonantum, Mass., consisting of main one-story unit, about 120 x 200 ft., and auxiliary structures, for production of hydraulic pumps and fluid motors for government. Plant will be windowless type and will cost about \$500,000 with equipment, fund to be furnished by Defense Plant Corp., Washington.

**Bird & Son, Inc.**, East Walpole, Mass., roofing and building papers, wallboard products, etc., plans one-story addition, 155 x 360 ft., to branch plant at Phillipsdale, R. I., for expansion in dryer department and other divisions, storage and distribution. Cost close to \$100,000 with equipment. Ganteaume & McMullen, 99 Chauncy Street, Boston, are consulting engineers.

**Corn Products Refining Co.**, 17 Battery Place, New York, plans expansion in branch mill at 1901 Bedford Street, North Kansas City, Mo., for increase of about 40 per cent in processing departments and other production divisions; also for storage and distribution units. Power house will be enlarged and new 4000-kw. turbine-generator, two boilers with rating of about 65,000 lb. of steam per hr., and auxiliary equipment installed. Cost over \$2,000,000 with machinery.

**Carbide & Carbon Chemicals Corp.**, 30 East Forty-second Street, New York, has let contract to Ford, Bacon & Davis, Inc., 39 Broadway, engineer and contractor, for design and construction of one and multi-story additions to branch plant at Texas City, Tex. Cost over \$400,000 with equipment.

**Vanadium Corp. of America, Inc.**, 420 Lexington Avenue, New York, plans new plant at Monticello, Utah, for production of vanadium pent-oxide and allied specialties for government. Cost about \$725,000, fund to be furnished by Defense Plant Corp., Washington.

**Department of Docks**, Pier A, North River, New York, plans new pier at Pier 79, North River, with shed unit, operating machinery, mechanical-handling and other equipment. Cost close to \$2,400,000.

**Continental Can Co.**, 100 East Forty-second Street, New York, plans one-story plant at Grand and Twenty-fifth Avenues, Franklin Park district, Chicago, to be operated in conjunction with present local plants. Cost

over \$100,000 with equipment. W. W. Taylor, 4633 West Grand Avenue, Chicago, is company architect. Company also has tentative plans for expansion in branch plant at Kansas City, Mo.

**Alleghany Refining Co.**, Bolivar, N. Y., has let general contract to Rust Engineering Corp., Clark Building, Pittsburgh, for addition to oil refinery. Cost over \$50,000 with equipment.

**Chevrolet Motor & Axle Division**, General Motors Corp., Tonawanda, N. Y., has let general contract to Darin & Armstrong, Inc., 2041 Fenkel Avenue, Detroit, at \$1,600,876, for one-story addition, 314 x 980 ft., for aircraft engine-testing shop for government. Entire project will cost about \$3,600,000 with equipment, fund in that amount to be secured through Defense Plant Corp., Washington.

**Albert Kahn Associated Architects & Engineers, Inc.**, Detroit, is architect and engineer.

**Strong Steel Foundry Co.**, 33 Norris Street, Buffalo, steel castings, etc., has taken out permit for one-story addition. Cost close to \$40,000 with equipment.

**Electronic Mechanics, Inc.**, 85 Hazel Street, Paterson, N. J., radio and kindred equipment, plans one-story factory for production of radio apparatus for government. Cost about \$98,120 with equipment, fund in that amount to be secured through Defense Plant Corp., Washington.

**Warren Foundry & Pipe Corp.**, Sitgreaves Street, Phillipsburg, N. J., has let general contract to J. G. White Engineering Corp., 80 Broad Street, New York, for one-story mill, new head house, hoisting and conveying building, six-way mine shaft and other units at Mount Hope iron ore mine, Wharton, N. J. Cost over \$1,500,000 with machinery.

**United States Rubber Co.**, 1230 Sixth Avenue, New York, has let general contract to William J. Lange, Inc., 1617 Fifty-first Street, North Bergen, N. J., for two additions to branch plant at North Bergen, each one-story, 100 x 200 ft., and 100 x 150 ft., respectively. Cost close to \$175,000 with equipment.

**Continental Can Co.**, Fifteenth Street, Jersey City, N. J., has leased two floors in building owned by S. B. Penick & Co., Brunswick Street, totaling 30,000 sq. ft. of floor space, for storage and distribution.

**National Lead Co.**, 111 Broadway, New York, plans new dock at branch plant at South Amboy, N. J., fronting on Raritan River, with unloading equipment and other mechanical-handling facilities. Cost close to \$250,000 with equipment.

**Commanding Officer**, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Nov. 17 for bolts (Circular 935), rigid steel conduit (Circular 938).

**Bloomfield Scrap Iron & Metal Co.**, Leesville Avenue, Rahway, N. J., plans new one-story storage and distributing plant, about 50 x 200 ft., at Woodbridge, N. J. Cost close to \$40,000 with mechanical-handling and other equipment. J. Centanni, 278 Summer Avenue, Newark, N. J., is architect.

**Westinghouse Electric & Mfg. Co.**, East Pittsburgh, has let general contract to Salmond-Serimshaw Construction Co., 58 Elm Street, Arlington, N. J., for five one-story additions to branch plant at Bloomfield, N. J. This is part of expansion to be carried out at this plant and branch works at Fairmont, W. Va., for production of radio equipment for government, entire project to cost about \$1,408,700 for land, buildings and machinery. Fund in that amount will be provided by Defense Plant Corp., Washington.

**Bureau of Yards and Docks**, Navy Department, Washington, asks bids (no closing date stated) for electric traveling bridge crane for Philadelphia Navy Yard; also for similar cranes for Navy yards at Charleston, S. C., and Pearl Harbor, T. H.; Roosevelt Base, Terminal Island, Cal.; naval submarine base, St. Thomas, V. I., and naval air station, Coco Solo, Canal Zone (Specification 10643).

**National Can Co., Inc.**, 600 South Delaware

Avenue, Philadelphia, has let general contract to Brown & Matthews, Inc., 122 East Forty-second Street, New York, for three one-story additions, largest unit about 150 x 300 ft. Cost over \$425,000 with equipment.

**Phoenix Iron Co., Inc.**, Phoenixville, Pa., plans expansion for production for government, to provide increase in steel ingot capacity of about 50,000 tons annually. Cost about \$500,000, fund in that amount to be furnished by Defense Plant Corp., Washington.

**Bessemer & Lake Erie Railroad Co.**, Greenville, Pa., is erecting one-story addition at local locomotive repair shops, to include engine pit and other facilities. Wells Construction Co., Schofield Building, Cleveland, is general contractor. Cost close to \$55,000 with equipment.

**American Hammered Piston Ring Division**, Koppers Co., Bush and Hamburg Streets, Baltimore, has let general contract to Leimbach & Williams, 20 East Lexington Street, for one-story addition and improvements in present plant. Cost over \$150,000 with equipment. Robert N. Gibson is company engineer.

**Bureau of Yards and Docks**, Navy Department, Washington, asks bids (no closing date stated) for new graving dock at South Boston Navy Yard (Specification 10717); also bids (no closing date stated) for extensions and improvements in steam power house for heating service at naval research laboratory, Bellevue, D. C., including boiler units and accessories, piping, instruments, etc. (Specification 10446).

**Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Nov. 18 for 65,500 galvanized iron conduit bushings; also 110,000 similar bushings, for Brooklyn and Western Navy yards, respectively (Schedule 9308); galvanized iron or steel close-link boat chains for Boston and Puget Sound yards (Schedule 9283).

## The South

• **Avondale Marine Ways, Inc.**, Westwego, La., plans expansion in ship repair plant for vessels for government. About \$116,000 will be expended for equipment, fund in that amount to be furnished by Defense Plant Corp., Washington.

**Consolidated Chemical Industries, Inc.**, Petroleum Building, Houston, Tex., plans expansion in branch plant at Baton Rouge, La., for increased production of sulfuric acid. Cost close to \$550,000 with machinery.

**United States Marine Corps**, Navy Department, Arlington Annex, Arlington, Va., asks bids until Nov. 17 for welding and cutting equipment (Schedule 881).

**Louisiana Shipyards, Inc.**, Industrial Canal, New Orleans, has let general contract to Pittman Brothers Construction Co., 2800 North Galvez Street, for two one-story mechanical shops and bulkhead assembling buildings. Cost over \$150,000 with equipment. This is part of expansion being carried out for handling government vessels. J. G. White Engineering Corp., Hibernia Bank Building, is consulting engineer.

**Pepsi-Cola Louisville Bottlers, Inc.**, 1104 Bardstown Road, Louisville, has let general contract to Leslie V. Abbott, 2321 South Brook Street, architect-contractor, for one-story addition, 160 x 300 ft., for expansion in mechanical-bottling division. Cost over \$80,000 with machinery.

**Nelio Resin Processing Corp.**, Jacksonville, Fla., plans one-story branch processing and distillation plant at Savannah, Ga., including storage and distributing buildings, steam power house and auxiliary structures. Cost about \$200,000 with equipment.

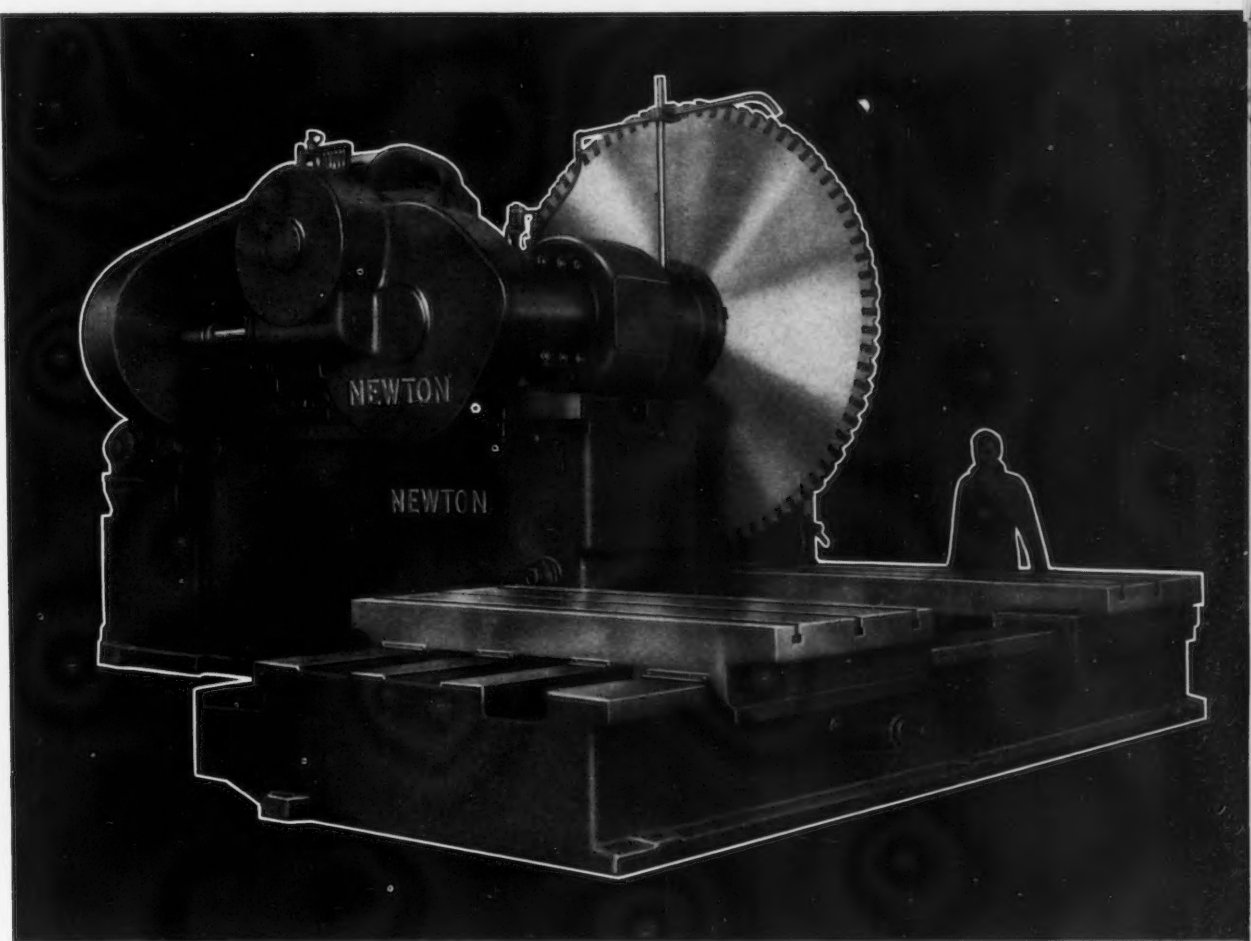
**Post Quartermaster**, Fort Eustis, Va., asks bids until Nov. 17 for electric drills, wrenches, copper tubing, electric hand drill, augers, grinders, cutters, couplings and other equipment (Circular 258-42-26).

**Coastal Refineries, Inc.**, Port Isabel, Tex.,



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**OFF TO A GOOD START  
WITH NEWTON HYDRAULIC FEED COLD SAWS**



Newton Hydraulic Feed Cold Saws will get your defense work off to a good start. The combination of hydraulic feed and a basically new design which provides for the saw blade cutting up permits the use of increased feeds at the same time reducing saw tooth breakage and the necessity for frequent saw sharpening.

Whether you are cutting ferrous or non-ferrous metals, standard shop work or forging, Newton Hydraulic Feed Cold Saws will increase your production and give you smooth, efficient cutting off service.

Newton Hydraulic Feed Cold Saws are built in blade sizes from 32" diameter up. Illustrated is a recently built 120" Newton Hydraulic Feed Cold Saw, the largest ever built, which is engaged in defense work.

Send for Bulletin #536A which tells more about these Hydraulic Feed Cold Saws.

BETTS • BETTS-BRIDGEFORD • NEWTON • COLBURN • HILLES & JONES • MODERN

**C O N S O L I D A T E D  
M A C H I N E   T O O L   C O R P O R A T I O N  
R O C H E S T E R ,   N E W   Y O R K**

plans expansion in storage and distribution department, including six steel tanks, each 5000-bbl. capacity, and auxiliary equipment.

**International Harvester Co.,** Motor Truck Division, 180 North Michigan Avenue, Chicago, and 1215 South Lamar Street, Dallas, Tex., has let general contract to George P. O'Rourke Construction Co., 2019½ Jackson Street, Dallas, for new one and two-story factory branch, storage and service plant at 1809 South Lamar Street, with office unit adjoining. Cost about \$230,000 with equipment.

**LaGloria Corp.,** Jones Building, Corpus Christi, Tex., plans extensions in gas recycling plant for increase in natural gas processing division. Cost close to \$75,000 with machinery.

## Central States

• **United Aircraft Products, Inc.,** Dayton, Ohio, has let general contract to Austin Co., Cleveland, for new one-story plant, about 122 x 165 ft., near Wright Field. Cost close to \$125,000 with equipment.

**Cuyahoga Tool & Mold Co.,** 16131 Holmes Avenue, Cleveland, has let general contract to Carl G. Jensen, 12403 Woodside Street, for one-story addition, about 56 x 60 ft. Cost close to \$40,000 with equipment. William A. Bingham, 1531 East 254th Street, Euclid, Ohio, is architect.

**Goodyear Aircraft Corp.,** Akron, Ohio, subsidiary of Goodyear Tire & Rubber Co., same place, plans works for production of outer wings, control surfaces and allied aircraft specialties for government, which has authorized fund of \$4,343,600 for buildings and equipment.

**Westinghouse Electric & Mfg. Co.,** East Pittsburgh, has approved plans for one-story addition to branch plant at Mansfield, Ohio, about 100 x 300 ft., for expansion in enameling division. Plant manufactures electric refrigerators, porcelain enameled products, etc. Cost over \$175,000 with equipment.

**Eaton Mfg. Co.,** 739 East 140th Street, Cleveland, automobile heaters, axles, metal stampings, etc., plans expansion in local heater division plant, East Sixty-fifth Street and Central Avenue, with conversion of part of works for production of armor-piercing shot for government. Cost about \$800,000, larger part of fund to be expended for equipment. Cost will be defrayed by Defense Plant Corp., Washington.

**Yoder Co.,** 5500 Walworth Avenue, Cleveland, special machinery and parts, plans one-story addition, about 75 x 300 ft. Cost over \$85,000 with equipment. Wallace H. Hatch, Hippodrome Building, is architect.

**Public Service Co. of Indiana, Inc.,** 110 North Illinois Street, Indianapolis, is arranging expansion and improvements in plants and system to be carried out during next 36 months, including addition to Dresser steam-electric generating station near Terre Haute, Ind., with installation of new 50,000-kw. turbine-generating unit, high-pressure boilers and auxiliary equipment; also similar expansion at power plant at Edwardsport, Ind., where a new 35,000-kw. turbine-generator, boilers and accessories will be installed. Both projects are estimated at \$8,425,000. Further extensions will include about 450 miles of new transmission lines, estimated to cost \$3,350,000; new power substations, switching stations and auxiliary structures, to cost approximately \$2,700,000. Company is arranging immediate financing in gross amount of \$52,000,000 through sale of bonds and notes, of which approximately \$4,000,000 will be used to begin work.

**Curtiss-Wright Corp.,** Curtiss Propeller Division, 1231 West Morris Avenue, Indianapolis, plans expansion in local plant for production for government. Cost close to \$1,900,000, fund to be secured through Defense Plant Corp., Washington.

**Dixie Machinery Mfg. Co.,** 4206 Goodfellow Avenue, St. Louis, crushing and grinding machinery, parts, etc., plans expansion for production for government. Cost about \$100,000. Financing has been arranged through RFC.

**Bay Petroleum Co.,** McPherson, Kan., plans expansion and improvements in oil refinery, including additional equipment in gasoline production department; also steel tank facilities

for crude oil. Cost over \$60,000 with equipment.

**Measuregraph Co.,** 4245 Forest Park Boulevard, St. Louis, textile machinery and parts, has let general contract to William H. & Nelson Cunliff Co., 3320 Lindell Boulevard, for one-story addition, about 50 x 100 ft. Cost close to \$45,000 with equipment.

**P. D. George Co.,** 4153 Bingham Street, St. Louis, paints, varnishes, oils, etc., has let general contract to J. E. Williams Construction Co., St. Louis, for two-story addition, 110 x 145 ft., for storage and distribution, at 5200 North Second Street. Cost about \$50,000 with equipment. O. W. Stiegemeier, 4412 Lindale Avenue, is architect.

**International Industries, Inc.,** Ann Arbor, Mich., optical equipment, has let general contract to Austin Co., Curtis Building, Detroit, for one-story addition, about 100 x 100 ft., for production of binoculars and allied equipment for government. Cost about \$55,900. Fund in that amount will be secured through Defense Plant Corp., Washington.

**Detroit Diesel Engine Division,** General Motors Corp., 13400 West Outer Drive, Detroit, has let general contract to O. W. Burke Co., Fisher Building, for two-story addition, 50 x 550 ft. Cost close to \$450,000 with equipment.

**Continental Motors Corp.,** 12801 East Jefferson Avenue, Detroit, gas and gasoline engines, has let general contract to F. H. Martin Construction Co., Detroit, for one-story addition, about 70 x 160 ft., for an engine testing unit. Cost over \$100,000 with equipment. Giffels & Vallet, Inc., Marquette Building, is architect and engineer.

**Vickers, Inc.,** 1400 Oakman Boulevard, Detroit, hydraulic pumps, valves, etc., plans new local plant for production of aircraft equipment for government. Cost about \$8,590,900 for site, buildings and machinery, fund in that amount to be provided by Defense Plant Corp., Washington. This is in addition to a previous appropriation of \$1,436,700 secured through same agency for plant for manufacture of aircraft and ordnance equipment for government.

**American Metal Products Co.,** 5959 Linsdale Avenue, Detroit, castings, bushings, bearings, etc., has let general contract to Bryant & Detwiler Co., Penobscot Building, for one-story addition. Cost over \$50,000 with equipment. Giffels & Vallet, Inc., Marquette Building, is architect and engineer.

**Wire Sales Co., Inc.,** 4712 West Roosevelt Road, Chicago, wire goods, has let general contract to Arthur E. Nelson, 1244 East Seventy-ninth Street, for one-story addition, 105 x 160 ft. Cost over \$70,000 with equipment.

**Whitcomb Locomotive Co.,** 80 East Jackson Boulevard, Chicago, industrial locomotives, parts, etc., has let general contract to Hallbauer Construction Co., 452 West Belden Avenue, for one-story addition to plant at Rochelle, Ill., to be used in part as an erection shop. Cost over \$50,000 with equipment. Morton L. Pereira & Associates, Inc., 100 West Monroe Street, Chicago, is architect.

**Minneapolis-Honeywell Regulator Co.,** Twenty-eighth Street and Fourth Avenue South, Minneapolis, heat regulator and control equipment, has let general contract to C. F. Haglin & Sons, Inc., National Building, for four-story addition, for production of equipment for government. Cost about \$350,000 with machinery. E. J. Prondzinski, Plymouth Building, is architect.

**City Council,** Renwick, Iowa, asks bids until Nov. 17 for extensions and improvements in municipal power plant, including new 280-330-hp. diesel engine-generator unit and auxiliary equipment. Ralph W. Gearhart, 349 Twenty-first Street, S. E., Cedar Rapids, Iowa, is consulting engineer.

**Hercules Powder Co.,** Delaware Trust Building, Wilmington, Del., will begin work soon on new mill for production of smokeless powder for government near Merrimac, Wis., including machine shops, power station and auxiliary structures. Cost about \$65,000,000, of which \$42,000,000 will be expended for buildings, \$21,000,000 for equipment, and remainder for land and site improvements. Fund in gross amount will be secured through Defense Plant Corp., Washington.

**Commanding Officer,** Ordnance Department,

Rock Island Arsenal, Rock Island, Ill., has let general contract to Coath & Goss, Inc., 28 North LaSalle Street, Chicago, for one-story addition, 60 x 400 ft., for a motor shop and engineering building. Cost \$180,000 exclusive of equipment.

**Oconto Electric Co-operative, Inc.,** Oconto Falls, Wis., plans new hydroelectric generating plant on Oconto River. Cost about \$200,000, with equipment. Financing has been arranged through Federal aid.

## Western States

• **Vultee Aircraft Co., Inc.,** Lakewood Boulevard, Downey, Cal., has let general contract to Engineers, Ltd., 605 West Olympic Boulevard, Los Angeles, for six one-story additions for expansion in general service division. Cost about \$175,000 with equipment.

**Commercial Iron Works, Inc.,** foot of S. W. Grover Street, Portland, will take bids soon for one-story addition, 60 x 350 ft., to be used as a mold loft, in conjunction with other expansion at shipbuilding plant, previously noted. Cost over \$100,000 with equipment. Entire project, including two new shipways, will represent investment of about \$750,000 with equipment.

**Bureau of Supplies and Accounts,** Navy Department, Washington, asks bids until Nov. 18 for boiler water testing outfits, including spare parts, for Mare Island Navy Yard and other Western yards (Schedule 9315).

**Associated Shipbuilders, Inc.,** 2751 Sixteenth Street, S. W., Seattle, has approved plans for two one-story additions, 60 x 80 ft., and 100 x 175 ft., to be used for sheet metal shop, and storage and distributing building, respectively. Cost over \$60,000 with equipment.

**United States Rubber Co., Inc.,** 5675 Anaheim-Telegraph Road, Los Angeles, automobile tires and tubes, etc., has let general contract to Engineers, Ltd., 605 West Olympic Boulevard, for three one-story additions, 261 x 840 ft., for main unit for production of self-sealing gas tanks for military airplanes; 40 x 60 ft. for a tank-testing unit; and 40 x 70 ft. for a rubber cement processing building. Cost over \$450,000 with equipment. Llewellyn A. Parker, Architects' Building, is architect and engineer.

**Bureau of Reclamation,** Denver, asks bids until Nov. 19 for three 150,000-hp., vertical-shaft hydraulic turbines, and three oil-pressure, actuator-type governors for regulating speed of turbine units, for installation in Grand Coulee hydroelectric power plant, Grand Coulee, Columbia Basin project, Wash. (Specification 1013); until Nov. 25, hydraulic hoists for three 16 x 29.65 ft., penstock coaster gates at Grand Coulee dam (Specification 1012).

## Canada

• **St. Catharines Steel Products Co., Ltd.,** St. Catharines, Ont., is erecting one-story addition, 100 x 125 ft., for which general contract recently was let to T. R. Stork Co., St. Catharines. Cost close to \$75,000 with equipment. A. E. Nicholson, St. Catharines, is architect.

**Canadian Industries, Ltd.,** 1135 Beaver Hall Hill, Montreal, plans expansion in new nylon mill at Kingston, Ont., now in course of erection, with increase in processing and other production departments. Cost about \$1,000,000 with equipment, in addition to former appropriation of over \$2,500,000.

**McColl-Frontenac Oil Co., Ltd.,** 117 Harbour Street, Toronto, plans expansion in oil refinery on Cherry Street, including new one and multi-story unit to be used as a blending department. Cost over \$200,000 with equipment.

**Toronto Shipbuilding Co., Ltd.,** Fleet and Bathurst Streets, Toronto, has awarded general contract to Fraser-Brace Engineering Co., Ltd., 107 Craig Street West, Montreal, for addition which will practically double plant capacity. Cost about \$500,000 with equipment.

**City of Medicine Hat, Alta.,** will start work soon on an addition to power plant and installation of new equipment, to cost about \$275,000.